

**ENVIRONMENTAL IMPACT STATEMENT**  
**EIS NUMBER 01-81**

**MENDOTA POOL 10-YEAR EXCHANGE AGREEMENTS**  
**DRAFT**

**MAY 21, 2003**



**United States Department of the Interior  
South-Central California Area Office  
1243 "N" Street  
Fresno, California 93721-1813**



**BUREAU OF RECLAMATION**  
**UNITED STATES DEPARTMENT OF THE INTERIOR**

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**Fresno County, California**

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**Abstract:** This environmental impact statement evaluates the proposed exchange of up to 25,000 acre-feet of water per year over a 10-year period between the U.S. Bureau of Reclamation (Reclamation) and the Mendota Pool Group (MPG). Reclamation's purpose in authorizing this action is to facilitate the efficient delivery and re-allocation of water to facilitate environmental and economic benefits as authorized by 34 U.S.C. §3408(d), Central Valley Project Improvement Act (CVPIA). The need for the proposed authorization is to facilitate improvements in the reliability of irrigation water delivery to the San Luis Canal without affecting CVP water deliveries at Mendota Pool. The proposed action will offset cutbacks in CVP irrigation water supplies as a more balanced distribution of water among competing uses is sought. The MPG proposes to pump non-CVP groundwater into the Mendota Pool and exchange it with water from the CVP. This exchanged water will be delivered to land owned by MPG members elsewhere within the CVP service area. The proposed project is the result of discussions since the early 1990's and includes a baseline pumping program, design constraints, monitoring program, and an adaptive management approach. Two No Action alternatives are also considered: construction of new wells on MPG properties, and fallowing land. Six primary resource areas are evaluated: groundwater levels, land subsidence, groundwater quality, surface water quality, sediment quality, and biological resources. Six other resources areas are also evaluated. The proposed project would have less-than-significant effects on all resource areas except groundwater quality. The project would result in a significant cumulative effect on groundwater quality adjacent to the Pool. The two alternatives would significantly increase the cost of the water obtained and could also affect groundwater and subsidence in other areas.

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**Comments on this Draft EIS must be received on or before July 21, 2003**

**APPENDIX A**

**MENDOTA POOL GROUP MEMBERSHIP**

## **APPENDIX A**

### **MENDOTA POOL GROUP MEMBERSHIP**

#### **Mendota Pool Group Membership**

The Mendota Pool group is an unincorporated association, consisting of the following members:

Baker Farming Co.  
Blackburn Farming Co., Inc.  
Britz Mendota, TIC.  
Coelho West Farms  
Conejo Farms  
Fordel, Inc.  
Hansen Farms  
H.G.H. Farms  
Meyers Farming I  
Terra Linda Farms I  
JC&S Land Co.

**APPENDIX B**

**MONITORING PROGRAM**

## Table of Contents

	Page
B.1. INTRODUCTION .....	1
B.2. PUMPAGE .....	3
B.3. GROUNDWATER LEVELS .....	4
B.4. GROUNDWATER QUALITY .....	4
MONITORING OF MPG PRODUCTION WELLS .....	1
MONITORING OF NON-MPG WELLS .....	5
B.5. SURFACE WATER FLOW DIRECTION .....	6
B.6. SURFACE WATER QUALITY .....	6
B.7. SEDIMENT QUALITY.....	7
B.8. COMPACTION .....	7
B.9. REPORTING .....	8

### Tables:

- Table B-1 Summary of Monitoring Program
- Table B-2 Construction Data For Wells Used for Groundwater Level and Quality Monitoring
- Table B-3 Groundwater Level Monitoring Network
- Table B-4 Groundwater Quality Monitoring Network
- Table B-5 Analytical Methods and Detection Limits for Water Quality Analyses
- Table B-6 Surface Water Quality Monitoring Network
- Table B-7 Sediment Quality Monitoring Network
- Table B-8 Analytical Methods and Detection Limits for Sediment Quality Analyses

### Figures:

- Figure B-1. Groundwater Level Monitoring Network
- Figure B-2. Groundwater Quality Monitoring Network
- Figure B-3. Surface Water Sampling Locations
- Figure B-4. Sediment Sampling Locations

Attachment 1. Sample Collection and Quality Control Procedures for Water and Sediment Samples

The monitoring program for the 10-year proposed project will be an expanded version of the Mendota Pool Group (MPG) monitoring program developed in 1999 by Luhdorff and Scalmanini, Consulting Engineers (LSCE), consultants to the MPG, and Kenneth D. Schmidt and Associates (KDSA), consultants to the San Joaquin River Exchange Contractors Water Authority (SJREC) and Newhall Land and Farming Co. (NLF). This program was designed to monitor the potential long-term effects of MPG transfer pumping on groundwater levels, groundwater quality, flow direction, and surface water quality in the Mendota Pool, and land subsidence in the Mendota area. Details of the 1999 monitoring program were provided in the Phase I report (KDSA and LSCE 2000a).

Since 1999, the monitoring program has been expanded each year. Details of the 2000 monitoring program were provided in the Phase II report (KDSA and LSCE 2000b) and the 2000 Annual Report (LSCE and KDSA 2001). Details of the 2001 monitoring program were provided in the EA for the 2001 pumping program (Reclamation 2001) and the 2001 Annual Report (LSCE and KDSA 2002). The 2002 monitoring program is summarized in the EA for the 2002 pumping program (Reclamation 2002). The program for the 10-year proposed project (Table B-1) will be generally similar to the 2002 monitoring program.

Changes to the monitoring program since 1999 include an increased number of wells used for groundwater level and quality monitoring. Additional groundwater quality sampling events were added in some years to investigate seasonal fluctuations of groundwater quality and variations among analytical laboratories. Analyses were performed for additional trace metals such as arsenic and molybdenum, and lower detection limits were used for selenium analyses. The surface water sampling program has also been expanded with additional sample locations, sampling events, and the installation of a continuous electrical conductivity (EC) recorder in the Mendota Wildlife Area (MWA) at the request of the California Department of Fish and Game (CDFG). Also at the request of CDFG, the MPG added sediment quality sampling to the program in 2001. Finally, in response to comments received on environmental documents prepared to obtain exchange agreements between Reclamation and the MPG, the study area was enlarged in 2001 to encompass at least a 6-mile radius from the approximate center of the MPG wells in Farmers Water District (FWD). For the portion of the expanded study area east of the Chowchilla Bypass, only water level monitoring is being conducted at this time. The MWA is included only for evaluation of potential surface water quality impacts.

The monitoring program requires the participation of many entities, in addition to the MPG. Thus, although the MPG collects and compiles a large amount of the necessary data, it must rely on the cooperation of all participants in order to fully accomplish the program objectives. Recognizing that there are different participants in the program, four levels of participation have been defined to characterize the roles and responsibilities of the various entities:

**Level I** – This level is comprised of the MPG members and encompasses the monitoring activities where the MPG has control over (1) the environmental components monitored, (2) the data quality objectives, and (3) the monitoring frequency. This includes groundwater level and quality monitoring in wells owned by the MPG and the collection of surface water and sediment samples. The

monitoring of the USGS monitoring wells west of the Mendota Airport and the Fordel extensometer are also considered Level I activities because these are located on property owned by one of the MPG members. Level I activities do not include monitoring conducted by the Meyers Farm Water Bank or pumpage data collected by the San Luis and Delta-Mendota Water Authority (SLDMWA). Monitoring efforts of the Level I participants are coordinated through the MPG agent and consultants to the MPG.

**Level II** – This level consists of the SJREC and NLF, which are the signatories of the Settlement Agreement along with the MPG. These entities participate in the monitoring program under the terms of the Agreement. The SJREC consists of four entities: Central California Irrigation District (CCID), Columbia Canal Company (CCC), Firebaugh Canal Water District (FCWD), and San Luis Canal Company (SLCC). These entities are responsible for collection and analysis of groundwater quality samples from wells in their respective service areas and surface water quality samples from their canal intakes. The SJREC maintains continuous recorders to monitor EC at its canal intakes, and CCID monitors compaction and water levels at the Yearout Ranch extensometer. The SJREC and NLF also provide monthly pumpage data for their wells. These entities also grant the MPG access to specific wells, primarily for water level monitoring purposes. The data quality objectives and monitoring frequency can be coordinated between the MPG and these entities.

**Level III** – This level of participation applies to the various public agencies, including the San Luis and Delta-Mendota Water Authority (SLDMWA), Reclamation, the City of Mendota, the U.S. Geological Survey (USGS), and the Department of Water Resources (DWR), that conduct monitoring programs as part of their regular duties. Fresno County provides data for monitoring wells at the Mendota disposal site, and the Regional Water Quality Control Board (RWQCB) provides water quality data for the Spreckels Sugar Co. wells. These agencies generally provide data to the MPG upon request. The data collected, data quality objectives, and monitoring frequencies are set by the respective agencies relative to their requirements. The MPG has no control over monitoring conducted by these agencies.

**Level IV** – This level includes all other entities in the area not included in the preceding three levels. This includes water districts such as Westlands Water District, James Irrigation District, Tranquillity Irrigation District, and Aliso Water District, and corporations such as Spreckels Sugar Co., AES Mendota (formerly Mendota Biomass), and Locke Ranch. Participation by these entities in the MPG monitoring program is voluntary. The MPG regularly requests data from these entities with varying success. In certain cases, the MPG has been granted access to non-MPG properties to monitor water levels or collect water quality samples from specific wells. When samples are collected by the MPG, the MPG would specify the data to be collected and the data quality objectives. The monitoring frequency at these properties depends in part on when access is granted. Otherwise, the MPG has no control over the data collected, data quality objectives, or monitoring frequencies.

The elements of the monitoring program for the proposed project are summarized on Table B-1 and described in the following sections. The monitoring program will be reevaluated annually and modified if conditions change or transfer pumping impacts are different than expected. Construction data for all wells in the groundwater level or quality monitoring networks are provided on Table B-2. Also indicated on this table is the type of data collected from each well, i.e., water levels and/or water quality, and the participation level of the well owner. This table does not include wells for which only pumpage data are obtained.

Pumpage from the MPG wells along the Fresno Slough branch of the Mendota Pool is metered at the introduction points where water from the wells enters the Pool. The majority of these wells are metered individually, but a number of shallow wells are manifolds together and metered in clusters. The SLDMWA reads the meters on a weekly basis during the irrigation season. Wells in FWD are metered individually, and pumpage is monitored on a monthly frequency by FWD. The MPG maintains records to determine whether the water is pumped for transfer or adjacent use.

Level II participants (the SJREC and NLF) provide monthly data for wells within their service areas. Only CCID and CCC provide metered pumpage data; FCWD and SLCC do not operate wells within the study area. The NLF wells south of Avenue 4 are metered, and pumpage for other wells is estimated based on monthly power records in conjunction with pump efficiency estimates from pump tests.

The City of Mendota is the only Level III entity that operates water supply wells within the study area. It has provided meter readings for its wells since 1999.

Since the beginning of the monitoring program in 1999, participation by Level IV entities in the study area has been sporadic. Spreckels Sugar Co. provided the combined monthly pumpage for its production wells in 1999 and 2000, but did not provide 2001 pumpage data. Spreckels has indicated that it will provide 2002 pumpage data. Locke Ranch provided an estimate of its annual pumpage in 1999 and 2000, but has not provided data for 2001 or 2002. Pumpage data for the Mendota Biomass well was not provided for 1999-2001, but Mendota Biomass (now AES Mendota) provided 2002 power use records for its production well. The MPG will continue to encourage participation in the monitoring program by these entities, including requesting pumpage data in future years. If the pumpage data are not provided, it will be estimated based on data from previous years.

A large portion of Aliso Water District in Madera County was added to the study area in 2001, but only one grower provided 2001 power use records for his wells. Pumpage for wells for which no data were provided was estimated based on typical crop water demands and the crop acreage shown on the 2001 Madera County land use map produced by DWR. The MPG will continue to request pumpage data from Aliso WD but will have to rely on estimates if the data are not provided. The area south of Aliso WD in Fresno County is undistricted, and pumpage data have not been requested in this area. This pumpage has been estimated based on typical crop water demands and the crop acreage shown on the 2000 Fresno County land use map produced by DWR. Pumpage estimates for the eastern portion of the study area are discussed in the 2001 Annual Report (LSCE & KDSA 2002). Pumpage from private domestic wells is disregarded because it is considered negligible relative to the magnitude of irrigation pumpage in the area.

Water level measurements will be made in a network of wells in the Mendota area in order to estimate the water level impacts caused by MPG transfer pumping. The wells in the monitoring network include both "shallow" (completed to a depth of 130 feet or less) and "deep" (completed below the A-clay but above the Corcoran Clay, i.e., between 200 to 450 foot depth) water supply wells, and shallow and deep monitoring wells. Some wells monitored by Reclamation in the eastern portion of the study area are composite wells (completed both above and below the Corcoran Clay). USGS monitoring well 31J6 is completed in the lower aquifer below the Corcoran Clay, west of the Fresno Slough. The wells in the water level monitoring network are listed on Table B-3, along with the entity responsible for monitoring each well and the planned monitoring frequency. The well locations are shown on Figure B-1.

Most of the wells included in the water level monitoring network are owned, operated, and/or monitored by entities that are signatories of the Agreement. The 2003 water level monitoring network includes 116 wells. Seventy-three wells are measured on a bimonthly frequency by the MPG, including seven wells east of the Chowchilla Bypass (Figure B-1).

WWD monitors four USGS monitoring wells in the southwestern corner of the study area, and has informed the MPG that the monitoring frequency will be reduced from monthly measurements in 2002 to semi-annual measurements in 2003. It is anticipated that the Meyers Farm Water Bank will continue to provide monthly water level data from its nine shallow monitoring wells located east of Fresno Slough. An additional 29 wells east of the Chowchilla Bypass are measured semi-annually by Reclamation (typically January and September), but many of these wells are either composite wells or wells of unknown depth.

In addition to the collection of manual measurements, three continuous water level recorders are in operation and will be maintained throughout the 10-year program. The MPG operates continuous recorders in USGS monitoring well 31J3 (near the Fordel extensometer) and FWD well R-5 (an unused production well near the San Joaquin River). The third continuous recorder is installed in the Yearout Ranch extensometer and is operated by CCID.

The purpose of this component of the monitoring program is to evaluate changes in groundwater quality and to forecast potential surface water quality impacts. The groundwater quality data are used in models for prediction of total dissolved solids (TDS) and boron concentrations in the Mendota Pool, as discussed in Appendix D. There are 170 wells in the current groundwater quality monitoring network; these are listed on Table B-4 and plotted on Figure B-2. The groundwater quality monitoring program may be modified annually based on the data gathered from the previous sampling year, review of the historical record, and water quality trend analyses.

#### **4.1 MONITORING OF MPG PRODUCTION WELLS**

The MPG will collect water quality samples on an annual basis from all MPG production wells that are in operation during the proposed 10-year project. Currently, 66 wells are scheduled to be pumped; and if possible, samples will also be collected from five wells that are not scheduled to be pumped (Fordel M-1, SC-6, CGH-6A and 6B, and FWD R-11) for a total of 71 MPG wells (Table B-4). Every year, a complete analysis will be conducted on samples from 21 of these wells. Samples from the remaining 50 wells will be analyzed for EC and TDS on an annual basis and a complete analysis will be conducted every other year, as indicated on Table B-4. The complete analysis will

include EC and TDS, general minerals (calcium, magnesium, sodium, potassium, boron, copper, iron, manganese, zinc, sulfate, chloride, bicarbonate, alkalinity, nitrate, and fluoride), pH, sodium adsorption ration (SAR), and additional trace elements (arsenic, molybdenum, and selenium).

The 21 MPG wells for which a complete sample analysis will be conducted annually are wells where additional data are required to evaluate water quality changes. This includes eight shallow wells which are considered to be impacted by wastewater (Fordel M-2, M-3, and M-4; Terra Linda TL-4C and TL-17; and Coelho West CW-3, CW-4, and CW-5) and three deep wells where the potential for future wastewater impacts is high (FWD wells R-1, R-3, and R-11). The Coelho West and FWD wells near the Spreckels Sugar Co. property will also be analyzed for barium, which is a common constituent in certain types of wastewater from the Spreckels' factory. Other MPG wells for which complete water quality analyses will be performed on an annual basis are Fordel M-1 and M-6, TL-10A and TL-14, CGH-6A and CGH-6B, FS-5 and FS-10, and CW-1 and CW-2.

The annual and biennial sampling schedules will provide sufficient data to regularly compare predicted and measured values and will ensure that data-supported modifications to the pumping program can be made throughout the project. The sampling will be conducted during the summer and fall when the wells are pumping. The analytical methods and required detection limits are listed in Table B-5. The selenium and molybdenum analyses will be conducted using methods able to achieve detection limits of at least 0.4 µg/l for selenium and 1 µg/l for molybdenum. Sample collection and quality control procedures are summarized in Attachment 1.

#### **4.2 MONITORING OF NON-MPG WELLS**

The groundwater quality monitoring network consists of 99 non-MPG wells, including 37 wells in the SJREC and NLF service areas. CCID samples its wells annually for general minerals and boron. CCC samples wells in its service area annually for EC and TDS and biennially for irrigation suitability (general minerals plus SAR). NLF samples nine of its production wells annually for irrigation suitability and selenium. Other NLF production wells are not sampled on a regular schedule. Data from these wells will be obtained and evaluated as available. Five NLF monitoring wells will be sampled annually for irrigation suitability and selenium.

The City of Mendota monitors water quality in three of its water supply wells west of the Fresno Slough and its three new wells on the B&B Ranch. Complete analyses (excluding molybdenum) have been conducted at least once a year, and more frequent sampling has been conducted in the active water supply wells. Only annual general mineral and inorganic data from the City's wells will be used in the MPG monitoring program.

Spreckels Sugar Co. samples its 32 monitoring wells and eight of its production wells semi-annually. The samples are analyzed for general minerals and trace elements (including boron and barium). Only a portion of the Spreckels Sugar Co. water quality data have been provided to the MPG, but the MPG has obtained other data from the RWQCB Central Valley Region. The MPG expects that future data will be available either from Spreckels Sugar Co. or the RWQCB.

The MPG will collect annual samples for complete analysis from seven monitoring wells located on MPG properties west of the Fresno Slough. These are USGS wells 31J4 and 31J5 and Meyers Farming wells S-1, S-2, S-3, P-1, and P-4. The Meyers Farm Water Bank has

installed nine monitoring wells (MF-1 through MF-9) east of the Slough, which are scheduled to be sampled semi-annually. Although the Meyers Farm monitoring program is separate from the MPG program, it is expected that annual data will be provided to the MPG upon request.

The purpose of the determination of surface water flow direction is to ensure compliance with the terms of the Settlement Agreement that MPG pumping will not occur when flow in the Fresno Slough branch of the Pool is to the north. The SLDMWA monitors flow in the Pool on a daily basis, including stage measurements at Mendota Dam, and has agreed to notify the MPG if a north flow event is expected to occur. As in previous years, the MPG will use daily records of inflows to and outflows from the Pool provided by the SLDMWA to calculate a detailed water budget for the portion of the Fresno Slough south of the Firebaugh Intake Canal. This analysis will be conducted at the end of each year. Included in the records obtained from SLDMWA are MPG pumping into the Slough, Kings River (James Bypass) inflows, and inflows from and diversions to the Mendota Wildlife Area (MWA), James and Tranquillity Irrigation Districts, Fresno Slough Water District, and WWD via Laterals 6 and 7 south of the MWA. Evaporation, seepage, and change in storage will be estimated as for previous years. The water budget calculations, including the amount of inflow to the MWA from the Delta-Mendota Canal (DMC), are used in the surface water mixing models to forecast water quality in the Mendota Pool.

The purpose of the surface water quality monitoring is to allow the MPG to detect any potential exceedances of water quality objectives and adjust the pumping program accordingly, and to ensure compliance with the water quality objectives at key locations in the Pool. The MPG currently conducts surface water sampling at 13 stations in the Mendota Pool, the DMC, or in canals that divert water from the Pool (Figure B-3). During periods when transfer pumping is occurring, a monthly sampling schedule is maintained by the MPG at the DMC terminus in the northern portion of the Fresno Slough and at three locations in the southern portion of the Slough: the MWA, the James ID Booster Plant, and the Lateral 6 & 7 intake (Table B-6). At the remaining nine sampling stations, the MPG will collect two samples per year, typically in June and October. The MPG also operates a continuous EC recorder at the MWA bridge located one mile south of Whites Bridge.

The surface water grab samples collected by the MPG will be analyzed for irrigation suitability. The semi-annual surface water samples are also analyzed for arsenic, molybdenum, and selenium. The laboratories, analytical methods, and required detection limits used to analyze these samples are listed in Table B-5. The sample collection and quality control procedures for the surface water quality monitoring program are summarized in Attachment 1.

Reclamation has been monitoring EC in the DMC at Bass Avenue (Check 21) since 1993 using a continuous recorder. As part of the DMC Water Quality Monitoring Program, Reclamation has also analyzed daily composite samples from the DMC and the CCID Main Canal at Bass Avenue for boron and selenium since July 2002. Monthly grab samples are also collected from these locations by Reclamation and analyzed for EC, pH, turbidity, and selenium, but only the selenium data have been provided to the MPG. The SJREC operates continuous EC recorders at its five canal intakes (Columbia Canal, CCID Main Canal, CCID Outside Canal, Firebaugh Intake Canal, and SLCC Arroyo Canal); the data from the Arroyo Canal are not utilized in this monitoring program. The SJREC has indicated that monthly grab samples will continue to be collected at the canal intakes. These samples will be analyzed for EC, boron, and selenium. In the southern portion of the Fresno

Slough, continuous EC monitoring has been conducted by James ID at its booster plant on the James Bypass since June 2001.

A sediment quality monitoring program was initiated in 2001 at the request of CDFG. Its objectives are to provide baseline characterization of metal concentrations in Pool sediments and to allow identification of temporal and spatial trends in sediment quality. Sediment samples were collected in August and October 2001, and in October 2002. The sampling program will continue on an annual schedule during the proposed 10-year project (Table B-7).

Sediment samples are collected in triplicate from eight stations in or near the Pool: the Columbia Canal intake, Mendota Dam, the DMC terminus, the Firebaugh Intake Canal intake, the Etchegoinberry introduction point, the MWA approximately one-quarter mile south of Whites Bridge, the James ID Booster Plant, and Lateral 6 (Figure B-4). The samples are analyzed for arsenic, boron, molybdenum, and selenium, along with grain size (percent sand, silt, and clay), cation exchange capacity (CEC), EC, total organic carbon (TOC), and pH. The latter four parameters are used to evaluate the ability of sediment to bind metals. The analytical methods and required detection limits for the sediment quality analyses are listed in Table B-8. The sample collection and quality control procedures for the sediment sampling program are summarized in Attachment 1.

Continuous compaction data are collected from two extensometers in the Mendota area to evaluate compliance with the subsidence criterion specified in the Settlement Agreement. The MPG installed the Fordel extensometer west of the Fresno Slough in 1999 and will continue to monitor it throughout the proposed project. The Yearout Ranch extensometer, located east of the Slough, was installed by DWR in 1965 and has been operated by CCID since 1999. Both extensometers monitor compaction above the Corcoran Clay, which was encountered at depths of 418 and 428 feet at Fordel and Yearout Ranch, respectively. The extensometers measure total compaction, which is the sum of the elastic and inelastic compaction. Inelastic compaction is generally irreversible and results in land surface subsidence. The inelastic compaction is calculated at the end of each year by subtracting the total compaction measured during the winter after groundwater levels have recovered from that measured during the previous winter.

The data collected for this monitoring program will be evaluated as received so that the MPG pumping program can be modified if unexpected impacts occur. The data will be fully analyzed at the end of each irrigation season to estimate the impacts caused by MPG transfer pumping. The data and analyses will be summarized in an annual report prepared by LSCE and KDSA at the end of each year. Future reports will be similar to the 2000 and 2001 annual reports (LSCE and KDSA 2001 and 2002). Major items to be included in the annual reports are listed below:

- The current monitoring program will be summarized, including tables and maps similar to those prepared for this appendix.
- Monthly MPG and non-MPG pumpage within the study area will be tabulated and compared with previous years.
- Depth-to-water measurements for each well in the bimonthly groundwater level monitoring program will be plotted on hydrographs. Contour maps of groundwater elevations in the shallow and deep zones will be prepared for both pumping and non-pumping periods. Drawdown during the irrigation season and recovery at the end of the season will be

calculated. The groundwater flow model will be used to estimate how much of the drawdown at each well was caused by MPG transfer pumping.

- Groundwater quality data for all wells will be tabulated. Groundwater quality contour maps prepared for previous reports will be updated if significant changes have occurred. The data will be evaluated to estimate any impacts caused by MPG transfer pumping.
- A daily water budget will be prepared to determine the flow direction and rate in the Fresno Slough branch of the Pool. Surface water grab sample results will be tabulated. Daily data from continuous EC recorders will be summarized on tables and plots.
- Compaction measured at the Fordel and Yearout Ranch extensometers will be plotted along with the continuous water level data. Elastic and inelastic compaction will be calculated for both locations. The groundwater flow model will be used to estimate how much of the inelastic compaction may have been caused by MPG transfer pumping.

The annual reports will be provided to the signatories to the Settlement Agreement and to Reclamation for their review.

**Table B-1. Summary of Monitoring Program**

<b>Item</b>	<b>Description</b>	<b>Number</b>	<b>Frequency</b>
Pumpage	MPG meter readings (Fresno Slough wells) <sup>1</sup>	All	Weekly
	MPG meter readings (FWD wells) <sup>1</sup>	All	Monthly
	SJREC (CCID and CCC) and NLF	All	Monthly
	Pumpage by others (measured or estimated)		As available
Groundwater Levels	Wells monitored by MPG	73	Bi-monthly <sup>2</sup>
	Wells monitored by others	43	Varies <sup>3</sup>
Groundwater Quality	Wells monitored by MPG	92	Annual
	Wells monitored by others	78	Annual
Surface Water Flow	Inflow and outflow measurements <sup>1</sup>	All	Daily
	Stage measurements <sup>1</sup>	1	Daily
Surface Water Quality	MPG grab sample locations	13	Varies <sup>4</sup>
	MPG EC logger (at MWA)	1	Continuous
	SJREC grab sample locations	4	Monthly
	SJREC EC loggers at canal intakes	4	Continuous
	Reclamation's grab sample locations	3	Monthly
	Reclamation's automated sampling locations	3	Continuous
Sediment Quality	MPG sample locations	8	Annual
Compaction	Compaction recorder monitored by MPG	1	Continuous
	Compaction recorder monitored by SJREC	1	Continuous

1. Monitored by the San Luis and Delta-Mendota Water Authority.

2. Includes two wells monitored continuously.

3. Includes one well monitored continuously by CCID.

4. Semi-annual sampling will be conducted at 9 locations. Monthly sampling will be conducted at 4 locations.

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
<b>MPG Wells</b>													
<b>Fordel, Inc.</b>	M-1	PW	D	T13S/R15E-20N1	300	200-300	180	18	159.61	Y	MPG	MPG	I
	M-2	PW	S	T13S/R15E-20N2	100	50-100	20	12	159.06	Y	MPG	MPG	I
	M-3	PW	S	T13S/R15E-20N3	100	50-100	20	12	NA	Y	MPG	MPG	I
	M-4	PW	S	T13S/R15E-20N4	99	60-95	35	12	NA	Y	MPG	MPG	I
	M-5	PW	S	T13S/R15E-20N5	100	60-100	30	12	NA	Y	MPG	MPG	I
	M-6	PW	S	T13S/R15E-20N6	100	60-100	30	12	NA	Y	MPG	MPG	I
<b>Terra Linda Farms</b>	TL-1	PW	D	T13S/R15E-29C2	275	150-275	140	16	151.65	Y	MPG	MPG	I
	TL-2	PW	D	T13S/R15E-29D	275	125-275	140	16	NA	Y	MPG	MPG	I
	TL-3	PW	D	T13S/R15E-20P	275	150-275	140	16	NA	Y	MPG	MPG	I
	TL-4A	PW	S	T13S/R15E-29	120	60-120	55	16	NA	Y	MPG	MPG	I
	TL-4C	PW	S	T13S/R15E-29	120	60-120	50	16	NA	Y	MPG	MPG	I
	TL-5	PW	D	T13S/R15E-32	400	200-400	170	16	NA	Y	MPG	MPG	I
	TL-6	PW	D	T13S/R15E-29	400	200-400	170	18	NA	Y	MPG	MPG	I
	TL-7	PW	D	T13S/R15E-32	NA	NA	NA	NA	156.89	NA	MPG	MPG	I
	TL-8	PW	D	T13S/R15E-29	NA	NA	NA	NA	NA	NA	MPG	MPG	I
	TL-10A	PW	S	T13S/R15E-29C	90	50-80	20	12	156.1	Y	MPG	MPG	I
	TL-10B	PW	S	T12S/R15E-29F5	80	50-80	20	12	NA	Y	MPG	MPG	I
	TL-10C	PW	S	T13S/R15E-29F6	80	50-80	12	12	NA	Y	MPG	MPG	I
	TL-11	PW	S	T13S/R15E-29F7	NA	NA	NA	NA	NA	NA	MPG	MPG	I
	TL-12	PW	S	T13S/R15E-29	130	40-130	25	16	NA	Y	MPG	MPG	I
	TL-13	PW	S	T13S/R15E-32	130	40-130	30	16	NA	Y	MPG	MPG	I
	TL-14	PW	S	T13S/R15E-32	130	40-130	30	16	NA	Y	MPG	MPG	I
	TL-15	PW	S	T13S/R15E-32	130	40-130	25	16	NA	Y	MPG	MPG	I

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
	TL-16	PW	S	T13S/R15E-19	120	60-120	50	16	NA	Y	MPG	I	
	TL-17	PW	S	T13S/R15E-29	120	60-120	50	16	NA	Y			
Terra Linda Farms	HS-3	UW	D	13S/15E-29F2	410	120-410	None	16	154.03	Y	MPG	I	
	D&H	UW	D	T13S/R15E-29K	360	160-360	None	16	NA	Y			
Etchegoainberry	No. 2	UW	S	T13S/R15E-29R3	120	50-100	20	16	151.26	Y	MPG		I
Coelho/Coelho/Fordel	CCF-2	PW	D	T13S/R15E-32	400	200-400	125	18	NA	Y	MPG		I
en	SC-3B	PW	S	T13S/R15E-32	130	40-130	30	16	NA	Y	MPG	I	
	SC-4B	PW	S	T13S/R15E-32	130	40-130	30	16	NA	Y			
	SC-6	PW	D	T13S/R15E-32J3	390	180-390	None	16	155.74	Y			
	CGH-1A	PW	S	T14S/R15E-4D	146	90-130	20	12	NA	Y	MPG	I	
	CGH-1B	PW	S	T14S/R15E-4D	147	90-131	20	12	NA	Y			
	CGH-1C	PW	S	T14S/R15E-4D	148	90-132	20	12	NA	Y	MPG	I	
	CGH-2	PW	S	T14S/R15E-5	146	75-115	20	12	NA	Y			
	CGH-6A	PW	S	T14S/R15E-5A	NA	NA	NA	NA	NA	NA	MPG	I	
	CGH-6B	PW	S	T14S/R15E-5A	NA	NA	NA	NA	NA	NA			
	CGH-6C	PW	S	T14S/R15E-5A	NA	NA	NA	NA	NA	NA	MPG	I	
	CGH-6D	PW	S	T14S/R15E-5A	NA	NA	NA	NA	NA	NA			
Meyers Farming	CGH-7	PW	D	T14S/R15E-5	NA	NA	NA	NA	NA	NA	MPG	I	
	CGH-9	PW	S	T14S/R15E-5	130	40-130	25	16	NA	Y			
	CGH-10	PW	S	T14S/R15E-5	130	40-130	25	16	NA	Y	MPG	I	
	MS-4	UW	S	T14S/R15E-5	130	60-130	50	16	156	Y	MPG	I	
	MS-5	PW	D	T14S/R15E-5	220	100-220	80	16	NA	Y			
Five Star	MS-7	PW	S	T14S/R15E-5	125	65-125	50	16	NA	Y			
	FS-1	PW	S	T14S/R15E-9C2	110	50-110	20	12	NA	Y	MPG		I

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
	FS-2	PW	S	T14S/R15E-9C3	110	60-110	20	12	NA	Y		MPG	I
<b>Five Star</b>	FS-3	PW	S	T14S/R15E-9C4	100	50-100	20	12	NA	Y		MPG	I
	FS-4	PW	S	T14S/R15E-9C5	100	50-100	20	12	NA	Y		MPG	I
	FS-5	PW	S	T14S/R15E-9C6	110	60-110	20	12	155.81	Y	MPG	MPG	I
	FS-6	PW	S	T14S/R15E-9C7	110	60-110	20	12	NA	Y		MPG	I
	FS-7	PW	S	T14S/R15E-9C8	110	60-110	20	12	NA	Y		MPG	I
	FS-8	PW	S	T14S/R15E-9C9	105	60-105	20	12	NA	Y		MPG	I
	FS-9	PW	S	T14S/R15E-9C10	110	60-110	20	12	NA	Y		MPG	I
	FS-10	PW	S	T14S/R15E-4P	100	20-100	20	12	154.38	Y		MPG	I
<b>Coelho West</b>	CW-1	PW	S	T14S/R15E-9B1	100	50-100	20	12	NA	Y		MPG	I
	CW-2	PW	S	T14S/R15E-9B2	100	50-100	20	12	NA	Y		MPG	I
	CW-3	PW	S	T14S/R15E-9C15	100	50-100	20	12	157.42	Y		MPG	I
	CW-4	PW	S	T14S/R15E-9C16	100	50-100	20	12	NA	Y		MPG	I
	CW-5	PW	S	T14S/R15E-9C17	110	60-110	20	12	NA	Y		MPG	I
<b>District</b>	R-1	PW	D	T13S/R15E-35C	277	100-276	None	16	NA	Y		MPG	I
	R-2	PW	D	T13S/R15E-27G1	301	136-300	None	16	NA	Y		MPG	I
	R-3	PW	D	T13S/R15E-34	304	107-303	None	16	NA	Y		MPG	I
	R-4	PW	D	T13S/R15E-25	296	112-296	None	16	NA	Y		MPG	I
	R-5	PW	D	T13S/R15E-26B1	322	180-322	72	16	NA	Y	MPG		I
	R-6	PW	D	T13S/R15E-27C1	400	100-400	20	20	NA	Y		MPG	I
	R-7	PW	D	T13S/R15E-23P1	400	100-400	20	20	166.18	Y	MPG	MPG	I
	R-8	PW	D	T13S/R15E-27H1	490	120-480	20	20	NA	Y	MPG	MPG	I
	R-9	PW	D	T13S/R15E-25N	480	240-480	None	20	NA	Y		MPG	I
	R-10	PW	D	T13S/R15E-27	480	240-480	20	16	NA	Y		MPG	I
	R-11	PW	D	T13S/R15E-34A	510	230-510	20	16	NA	Y		MPG	I
	WL-2	PW	D	T13S/R15E-26K1	242	101-242	16	20	170.23	Y	MPG		I
	EL-1	PW	D	T13S/R15E-25	268	98-268	16	20	NA	Y	MPG		I

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
<b>Baker Farming Co.</b>	BF-1	PW	D	T13S/R15E-27	400	160-400	115	16	NA	Y	MPG	MPG	I
	BF-2	PW	D	T13S/R15E-22	420	140-420	100	16	NA	Y		MPG	I
	BF-3	PW	D	T13S/R15E-22	420	140-410	100	16	NA	Y		MPG	I
	BF-4	PW	D	T13S/R15E-22	410	140-410	115	16	NA	Y		MPG	I
	BF-5	PW	D	T13S/R15E-22	NA	NA	NA	NA	NA	NA		MPG	I
<b>Panoche Creek Farms</b>	PCF-1	PW	D	T13S/R15E-27	NA	NA	NA	NA	NA	NA	MPG	MPG	I
<b>Non-MPG Wells (West of Chowchilla Bypass)</b>													
<b>Central California ID</b>	5A	PW	D	T13S/R15E-19G1	260	100-260	20	16	153.14	Y	MPG	CCID	II
	12C	PW	D	T13S/R14E-2P	180	80-180	NA	16	148.81	NA	MPG	CCID	II
	15B	PW	D	T13S/R14E-12E1	180	100-180	20	16	150.06	Y		CCID	II
	16B	PW	D	T13S/R14E-11H	185	95-180	NA	16	149.09	NA	CCID	CCID	II
	23B	PW	D	T13S/R14E-2	180	90-180	NA	16	148.51	NA		CCID	II
	32B	PW	D	T13S/R15E-19	225	100-225	None	16	152.81	WDS/Y	MPG	CCID	II
	35A	PW	D	T13S/R14E-12L1	190	80-190	20	16	151.11	Y	MPG	CCID	II
	38A	PW	D	T13S/R14E-12B3	290	126-290	88	16	153.08	Y	MPG	CCID	II
	Yearout E	MW	D	T13S/R15E-35D5	433	373-433	NA	4	166.79	Y	CCID		II
<b>Firebaugh Canal WD</b>	24R1	UW	D	T13S/R14E-24R1	326	216-316	30	16	NA	Y	MPG		II
	25D2	UW	D	T13S/R14E-25D2	NA	NA	NA	NA	NA	NA	MPG		II
<b>Columbia Canal Co.</b>	CC-1	PW	D	T13S/R15E-25	NA	NA	NA	NA	NA	NA	MPG	CCC	II
	CC-2	PW	D	T13S/R15E-23	455	180-455	None	16	NA	Y	CCC	CCC	II
	Cardella-1	PW	D	T13S/R15E-20	NA	NA	NA	NA	NA	NA		CCC	II
	Cardella-2	PW	D	T13S/R15E-16D	NA	NA	NA	NA	NA	NA	MPG	CCC	II
	Lopes-Ob	MW	S	T13S/R15E-17	100	80-100	20	2	NA	Y	MPG		II
	USBR-4	MW	S	T13S/R15E-22	100	60-100	20	2	165.55	Y	MPG		II

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level	
											WL	WQ		
<b>Columbia Canal Co.</b>	Elrod-1	PW	D	T12S/R14E-36	NA	NA	NA	NA	NA	NA	CCC	II		
	Elrod-2	PW	D	T12S/R14E-27	NA	NA	NA	NA	NA	NA	CCC	II		
	Burkhart-1	PW	D	T12S/R14E-28	NA	NA	NA	NA	NA	NA	CCC	II		
	DMA	PW	D	T12S/R14E-26	NA	NA	NA	NA	NA	NA	CCC	II		
	Davis	PW	D	T12S/R14E-34	NA	NA	NA	NA	NA	NA	CCC	II		
	Garcia-1	PW	D	T12S/R14E-35	NA	NA	NA	NA	NA	NA	CCC	II		
	Garcia-2	PW	D	T12S/R14E-35	NA	NA	NA	NA	NA	NA	CCC	II		
	Garcia-3	PW	D	T12S/R14E-35	NA	NA	NA	NA	NA	NA	CCC	II		
	Garcia-4	PW	D	T12S/R14E-34	NA	NA	NA	NA	NA	NA	CCC	II		
	Garcia-5	PW	D	T12S/R14E-35	NA	NA	NA	NA	NA	NA	CCC	II		
<b>B&amp;B Ranch</b>	Mowry Dr	PW	D	T13S/R15E-21K1	NA	NA	NA	NA	164.5	NA	MPG	CCC	II	
	Mowry El	PW	D	T13S/R15E-21	440	240-440	NA	16	NA	Y	MPG	CCC	II	
<b>Farming</b>	W-7	PW	D	T12S/R15E-34R1	288	170-276	NA	14	165	Y	USBR		III	
	W-8	PW	D	T13S/R15E-11B1	318	198-312	NA	14	166	WDS/Y	MPG		II	
	W-11	PW	D	T12S/R15E-34K1	296	180-280	NA	14	164	WDS/Y	MPG		II	
	W-12	PW	D	T13S/R15E-2G1	188	188-262	NA	16	165.5	Y	USBR		III	
	W-15	PW	D	T13S/R15E-14M1	304	180-300	NA	14	165	WDS/Y	MPG		II	
	W-32	PW	D	T12S/R15E-33P	310	170-300	NA	14	157.55	Y	MPG	NLF	II	
	W-42	PW	D	T13S/R15E-4	390	150-390	20	16	158.39	Y	MPG	NLF	II	
	W-53	PW	D	T13S/R15E-21	308	130-308	20	16	161.97	Y	MPG	NLF	II	
	W-74	PW	D	T13S/R15E-7	380	200-380	NA	16	160.41	Y	MPG	NLF	II	
	W-77	PW	D	T13S/R15E-15	400	200-380	NA	16	163.17	Y	MPG		II	
	W-78	PW	D	T13S/R15E-16	405	150-405	None	16	161.15	Y	MPG	NLF	II	
	W-89	PW	D	T13S/R15E-2	500	234-498	None	16	NA	Y	MPG	NLF	II	
	W-91	PW	D	T12S/R15E-33	500	228-498	None	16	158.24	Y	MPG	NLF	II	
	W-94	PW	D	T13S/R15E-22	500	225-498	None	16	165.33	Y	MPG	NLF	II	
<b>Farming</b>	W-95	PW	D	T13S/R15E-25	500	234-498	NA	16	169.25	Y	MPG	NLF	II	

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
<b>Mitigation Land Trust</b>	MW-1	MW	D	T13S/R15A-22	160	110-150	90	6	NA	Y	NLF		II
	MW-2	MW	S	T13S/R15A-25	80	40-80	30	4	166.82	Y	MPG	NLF	II
	MW-3	MW	S	T13S/R15E-16	80	40-80	20	4	160.40	Y	MPG	NLF	II
	MW-4	MW	S	T13S/R15E-3	80	40-80	20	4	159.03	Y	MPG	NLF	II
	MW-5	MW	S	T12S/R15E-33	95	35-95	20	4	156.19	Y	MPG	NLF	II
<b>Mitigation Land Trust</b>	MLT-W	UW	D	T13S/R15E-20G2	NA	NA	NA	NA	157.19	NA	MPG		IV
<b>Reclamation</b>	19R1	UW	D	T13S/R15E-19R1	247	NA	NA	NA	164.5	WDS	MPG		III
<b>Spreckels Sugar Co.</b>	MW-1	MW	S	T14S/R15E-4Q	82	38-78	20	6	166.79	Y	MPG	SSC	IV
	MW-2	MW	S	T14S/R15E-3	80	36-76	20	6	163.25	Y	MPG	SSC	IV
	MW-3	MW	S	T14S/R15E-4H	82	39-79	20	6	170.64	Y	MPG	SSC	IV
	MW-4	MW	S	T13S/R15E-34	72	30-70	20	6	166.07	Y	MPG	SSC	IV
	MW-5	MW	S	T13S/R15E-34	70	26-66	20	6	166.17	Y	MPG	SSC	IV
	MW-6	MW	S	T13S/R15E-34	82	38-78	20	6	166.70	Y	MPG	SSC	IV
	MW-7	MW	D	T13S/R15E-34	150	110-150	105	6	166.69	Y	MPG	SSC	IV
	MW-8	MW	D	T13S/R15E-34	150	120-150	110	6	163.21	Y	MPG	SSC	IV
	MW-9	MW	S	T13S/R15E-34	70	30-60	20	6	163.06	Y	MPG	SSC	IV
	MW-10	MW	D	T13S/R15E-34	150	120-150	110	6	164.77	Y	MPG	SSC	IV
	MW-11	MW	D	T13S/R15E-34N	150	120-150	110	6	163.60	Y	MPG	SSC	IV
	MW-12	MW	D	T13S/R15E-34	130	100-130	95	6	163.77	Y	MPG	SSC	IV
	MW-13	MW	S	T13S/R15E-34	70	30-60	20	6	163.79	Y	MPG	SSC	IV
	MW-14	MW	D	T13S/R15E-33F	190	120-190	110	6	164.00	Y	MPG	SSC	IV
	MW-15	MW	S	T14S/R15E-3	50	18-48	12	6	167.33	Y	MPG	SSC	IV
	MW-16	MW	D	T14S/R15E-3	150	110-150	100	6	166.36	Y	MPG	SSC	IV
	MW-17	MW	S	T14S/R15E-3	50	20-50	15	6	165.01	Y	MPG	SSC	IV
	MW-18	MW	S	T14S/R15E-3	50	20-50	15	6	166.29	Y	MPG	SSC	IV
<b>Spreckels Sugar Co.</b>	MW-19	MW	S	T14S/R15E-3	70	30-70	24	6	170.68	Y	SSC		IV
	MW-20	MW	S	T14S/R15E-3	66	35-65	NA	NA	167.17	Y	SSC		IV

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
Mendota Irrigation District	MW-21	EW	S	T14S/R15E-3	75	35-65	NA	NA	168.91	Y		SSC	IV
	MW-22	MW	D	T14S/R15E-3	160	118-158	NA	NA	167.61	Y		SSC	IV
	MW-23	EW	S	T14S/R15E-3	66	34-64	NA	NA	166.99	Y		SSC	IV
	MW-24	MW	S	T13S/R15E-34	62	30-50	NA	NA	166.57	Y		SSC	IV
	MW-25	MW	S	T14S/R15E-3	75	38-68	NA	NA	164.99	Y		SSC	IV
	MW-26	EW	S	T14S/R15E-3	65	33-63	NA	NA	167.94	Y		SSC	IV
	MW-27	MW	S	T14S/R15E-3	60	28-58	NA	NA	166.40	Y		SSC	IV
	MW-28	MW	S	T14S/R15E-2	76	38-68	NA	NA	168.58	Y		SSC	IV
	MW-29	MW	S	T13S/R15E-35	74	40-70	NA	NA	165.62	Y		SSC	IV
	MW-30	MW	S	T13S/R15E-35	75	38-68	NA	NA	169.08	Y		SSC	IV
	MW-31	MW	S	T13S/R15E-35	71	37-67	NA	NA	167.48	Y		SSC	IV
	MW-32	MW	S	T13S/R15E-35	70	37-67	20	6	170.10	Y	MPG	SSC	IV
	PW-1	PW	D	T13S/R15E-34	NA	200-440	180	16	NA	Y		SSC	IV
	PW-4	PW	D	T14S/R15E-3	NA	NA	NA	16	NA	NA		SSC	IV
	PW-6	PW	D	T13S/R15E-34	218	133-213	123	12	164.5	Y		SSC	IV
	PW-7	PW	D	T13S/R15E-34	224	139-219	129	12	164.4	Y		SSC	IV
	PW-8	PW	D	T13S/R15E-34	224	140-220	124	12	NA	Y		SSC	IV
	PW-9	PW	D	T13S/R15E-34	NA	NA	NA	NA	NA	NA		SSC	IV
	PW-10	PW	D	T13S/R15E-34	220	110-220	117	NA	NA	Y		SSC	IV
	PW-11	PW	D	T13S/R15E-35	300	160-300	140	14	NA	Y		SSC	IV
City of Mendota	No. 2	UW	D	T13S/R15E-30	250	140-250	134	16	NA	Y	MPG		IV
	No. 3	PW	D	T13S/R15E-30	308	168-288	150	14.5	NA	Y		City	IV
	No. 4	PW	D	T13S/R15E-30	310	180-290	180	14	NA	Y		City	IV
	No. 5	PW	D	T13S/R15E-19	258	174-246	160	16	NA	Y		City	IV
	No. 7	PW	D	T13S/R15E-21	405	260-395	235	14	NA	Y		City	IV
	No. 8	PW	D	T13S/R15E-21	405	240-375	230	14	NA	Y		City	IV
City of Mendota	No. 9	PW	D	T13S/R15E-21	405	260-395	240	14	NA	Y		City	IV
	18Q North	MW	D	T13S/R15E-19	252	132-252	122	2	NA	Y	MPG		IV

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
<b>Survey</b>	31J3	MW	D	T13S/R15E-31J3	415	400-410	NA	6	160.2	Y	MPG	MPG	I
	31J4	MW	S	T13S/R15E-31J4	70	55-65	NA	6	160.5	Y	MPG	MPG	I
	31J5	MW	D	T13S/R15E-31J5	260	240-250	NA	6	160.2	Y	MPG	MPG	I
	31J6	MW	L	T13S/R15E-31J6	500	480-490	NA	6	161.5	Y	MPG	MPG	I
	10A1	MW	S	T14S/R14E-10A1	18	13-18	2	2	202.2	Y	WWD	WWD	IV
	10A2	MW	S	T14S/R14E-10A2	88	81-86	75	2	201.0	Y	WWD	WWD	IV
	10A3	MW	D	T14S/R14E-10A3	347	332-342	323	6	202.5	Y	WWD	WWD	IV
	10A4	MW	D	T14S/R14E-10A4	194	178-188	171	5	201.8	Y	WWD	WWD	IV
<b>Hansen Farms</b>	7C1	PW	D	T14S/R15E-7C1	200	140-200	50	8	NA	Y	MPG	MPG	IV
<b>Meyers Farming</b>	S-1	MW	S	T14S/R15E-5	80	20-75	13	2	NA	Y	MPG	MPG	I
	S-2	MW	S	T14S/R15E-5	78	23-78	16	2	162.34	Y	MPG	MPG	I
	S-3	MW	S	T14S/R15E-5	79	24-79	17	2	159.05	Y	MPG	MPG	I
	P-1	MW	S	T14S/R15E-8	80	25-80	19	2	157.66	Y	MPG	MPG	I
	P-4	MW	S	T14S/R15E-8	80	24-79	21	2	NA	Y	MPG	MPG	I
	P-6	MW	S	T14S/R15E-8Q	79	24-79	18	2	161.08	Y	MPG	MPG	I
	MF-1	MW	S	T13S/R15E-33Q	80	38-68	28	2	159.42	Y	MF	MF	IV
	MF-2	MW	S	T13S/R15E-33L	80	38-68	30	2	158.35	Y	MF	MF	IV
	MF-3	MW	S	T14S/R15E-4C	70	40-60	30	2	158.42	Y	MF	MF	IV
	MF-4	MW	S	T14S/R15E-4A	70	40-60	30	2	159.89	Y	MF	MF	IV
	MF-5	MW	S	T14S/R15E-4F	60	40-50	25	2	158.44	Y	MF	MF	IV
	MF-6	MW	S	T14S/R15E-4G	75	55-70	20	2	164.99	Y	MF	MF	IV
	MF-7	MW	S	T14S/R15E-4K	55	35-50	20	2	160.01	Y	MF	MF	IV
	MF-8	MW	S	T14S/R15E-3L	55	35-50	20	2	161.41	Y	MF	MF	IV
	MF-9	MW	S	T14S/R15E-4H	55	35-50	20	2	160.67	Y	MF	MF	IV
<b>Non-MPG Wells (East of Chowchilla Bypass)</b>													
North of study area													

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
El Paco Ranch	#54	PW	D	T12S/R16E-16R1	296	170-286	16	191.0	NA	Y	USBR		III
<b>Aliso Water District</b>													
Woolf Enterprises	WE-75	PW	D	T13S/R16E-18H1	333	NA	NA	NA	NA	WDS	MPG		IV
Woolf Enterprises	WE-51	PW	D	T13S/R16E-19K1	380	NA	NA	NA	174	WDS	MPG		IV
Woolf Enterprises	WE-53	PW	D	T13S/R16E-30A1	392	190-390	NA	16	>175	WDS	USBR		III
Prosperi	DP-2	PW	D	T12S/R16E-31G1	NA	NA	NA	18	179	WDS	MPG		IV
Prosperi	DP-4	PW	D	T12S/R16E-31A	340	160-324	NA	16	NA	WDS/Y	MPG		IV
Lyon Packing	LP-11	PW	D	T13S/R16E-5C1	316	NA	NA	14	182	WDS	USBR		III
Giffen Ranch	GIF-23	PW	D	T13S/R16E-8H1	264	NA	NA	14	179.1	WDS	USBR		III
Groefsema Ranches	GR-28	PW	D	T13S/R16E-14H2	304	NA	NA	12	197.8	WDS	USBR		III
Golden State Vinters	GSV-H	PW	D	T13S/R16E-16D2	258	NA	NA	12	179.0	WDS	USBR		III
Golden State Vinters	GSV-646	PW	D	T13S/R16E-20J1	404	185-360	NA	16	>180	WDS	USBR		III
<b>Gravelly Ford WD</b>													
Simpson	26H1	PW	D	T12S/R16E-26H1	330	130-298	NA	12	201	WDS	MPG		IV
<b>County)</b>													
Simpson	25A2	PW	D	T12S/R16E-25A1	150	135-150	NA	NA	209	WDS	MPG		IV
<b>County)</b>													
Horner	34C1	PW	D	T13S/R16E-34C1	240	104-236	NA	16	183	WDS	MPG		IV
Unknown	4L1	PW	D	T14S/R16E-4L1	340	128-328	NA	16	>170	WDS	USBR		III
Schaad	NA	PW	D	T13S/R16E-22J1	264	150-260	NA	14	191.0	WDS	USBR		III
Schaad	NA	PW	D	T13S/R16E-22J2	320	116-236	NA	14	191.0	WDS	USBR		III
Schaad	NA	PW	D	T13S/R16E-27A2	372	150-365	NA	16	190.0	WDS	USBR		III
Schaad	#3	PW	D	T13S/R16E-27F1	300	108-248	NA	16	185.5	WDS	USBR		III
Schaad	NA	PW	D	T13S/R16E-29F1	360	NA	NA	16	176.0	WDS	USBR		III
Larry Shehadey Farms	NA	PW	D	T13S/R16E-30L3	400	135-400	NA	16	>175	WDS	USBR		III
Larry Shehadey Farms	NA	PW	D	T13S/R16E-30Q1	340	130-340	NA	16	>175	WDS	USBR		III

**Table B-2. Construction Data for Wells Used for Groundwater Level and Quality Monitoring**

Owner	Well ID	Type of Well <sup>1</sup>	Depth Zone <sup>2</sup>	State Well No.	Total Depth (ft)	Perf. Interval (ft)	Seal Depth (ft)	Casing Dia. (in)	Wellhead Elevation (ft msl)	Drillers Log or WDS <sup>3</sup>	Measured Parameter <sup>4</sup>		Participation Level
											WL	WQ	
Larry Shehadey Farms	NA	PW	D	T13S/R16E-32F1	378	116-368	NA	16	>175	WDS	USBR		III
Larry Shehadey Farms	NA	PW	D	T13S/R16E-33B2	352	NA	NA	16	177.0	WDS	USBR		III
Larry Shehadey Farms	NA	PW	D	T13S/R16E-33F1	370	120-360	NA	16	175.5	WDS	USBR		III
Larry Shehadey Farms	NA	PW	D	T13S/R16E-33L1	400	192-400	NA	16	>175	WDS	USBR		III
Agape Farms	NA	PW	C	T13S/R16E-34C2	405	150-395	NA	16	183.0	WDS	USBR		III
Agape Farms	NA	PW	D	T13S/R16E-34D1	346	150-346	NA	16	>180	WDS	USBR		III
Agape Farms	NA	PW	C	T13S/R16E-34P2	418	220-418	NA	NA	181.0	WDS	USBR		III
Connolly	NA	PW	D	T14S/R16E-3F1	330	120-320	NA	16	182.0	WDS	USBR		III
Duran	NA	PW	D	T14S/R16E-3P1	380	NA	NA	16	>175	WDS	USBR		III
Bar 20 Partners Ltd.	NA	PW	D	T14S/R16E-5J1	376	175-320	NA	16	169.5	WDS	USBR		III
Bar 20 Partners Ltd.	NA	PW	D	T14S/R16E-5L2	400	220-?	NA	16	168.0	WDS	USBR		III
Bar 20 Partners Ltd.	NA	PW	D	T14S/R16E-6B1	420	180-420	NA	16	171.5	WDS	USBR		III

1. PW = Production Well; MW = Monitoring Well; UW= Unused Production Well

2. S = Shallow (<130 ft deep); D = Deep (>130 ft deep); L = Lower Aquifer (below Corcoran Clay); C = Composite Well (likely to be completed above and below Corcoran Clay)

3. WDS = DWR Well Data Sheet available; Y = Drillers log available

4. WL = Water Level; WQ = Water Quality

Responsible Entities: MPG = Mendota Pool Group, CCID = Central California Irrigation District, CCC = Columbia Canal Company, NLF = Newhall Land and Farming

USBR = U.S. Bureau of Reclamation, SSC = Spreckels Sugar Co., City = City of Mendota, WWD = Westlands Water Distict, MF = Meyers Farming

NA = Information not available

**Table B-3. Groundwater Level Monitoring Network**

Owner	Well ID	State Well Number	Frequency	Entity <sup>1</sup>
<b>MPG Wells</b>				
Fordel, Inc.	M-1 M-2	T13S/R15E-20N1 T13S/R15E-20N2	Bimonthly Bimonthly	MPG MPG
Terra Linda Farms	TL-6 TL-10A HS-3 D&H	13S/15E-29 T13S/R15E-29C 13S/15E-29F2 T13S/R15E-29K	Bimonthly Bimonthly Bimonthly Bimonthly	MPG MPG MPG MPG
Etchegoinberry	No. 2	T13S/R15E-29R3	Bimonthly	MPG
Coelho/Coelho/Fordel	CCF-2	T13S/R15E-32	Bimonthly	MPG
Meyers Farming	MS-4 MS-5	T14S/R15E-5 T14S/R15E-5	Bimonthly Bimonthly	MPG MPG
Five Star	FS-5	14S/15E-9C6	Bimonthly	MPG
Farmers Water District	R-5 R-7 R-8 WL-2 EL-1	T13S/R15E-26B1 T13S/R15E-23P1 T13S/R15E-27H1 T13S/R15E-26K1 T13S/R15E-25	Continuous Bimonthly Bimonthly Bimonthly Bimonthly	MPG MPG MPG MPG MPG
Baker Farming Co.	BF-2	T13S/R15E-22	Bimonthly	MPG
Panoche Creek Farms	PCF-1	T13S/R15E-27	Bimonthly	MPG
<b>Non-MPG Wells (West of Chowchilla Bypass)</b>				
Central California ID	5A 15B 32B 35A 38A Yearout Extensometer	T13S/R15E-19G1 T13S/R14E-12E1 T13S/R15E-19 T13S/R14E-12L1 T13S/R14E-12B3 T13S/R15E-35D5	Bimonthly Bimonthly Bimonthly Bimonthly Bimonthly Continuous	MPG MPG MPG MPG MPG CCID
Firebaugh Canal WD	24R1 25D2	T13S/R14E-24R1 T13S/R14E-25D2	Bimonthly Bimonthly	MPG MPG
Columbia Canal Co.	CC-1 Cardella-2 (Lopes-1) Lopes-Obs. USBR-4	T13S/R15E-25F1 T13S/R15E-16 T13S/R15E-17 T13S/R15E-22	Bimonthly Bimonthly Bimonthly Bimonthly	MPG MPG MPG MPG

**Table B-3. Groundwater Level Monitoring Network**

<b>Owner</b>	<b>Well ID</b>	<b>State Well Number</b>	<b>Frequency</b>	<b>Entity<sup>1</sup></b>
<b>B &amp; B Ranch</b>	Mowry Diesel	T13S/R15E-21K1	Bimonthly	MPG
	Mowry Electric	T13S/R15E-21	Bimonthly	MPG
<b>Mitigation Land Trust</b>	MLT-W	T13S/R15E-20G2	Bimonthly	MPG
<b>USBR</b>	19R1	T13S/R15E-19R1	Bimonthly	MPG
<b>Newhall Land &amp; Farming</b>	W-7	T12S/R15E-34R1	Semi-annual	USBR
	W-8	T13S/R15E-11B1	Bimonthly	MPG
	W-11	T12S/R15E-34K1	Bimonthly	MPG
	W-12	T13S/R15E-02G1	Semi-annual	USBR
	W-15	T13S/R15E-14M1	Bimonthly	MPG
	W-32	T12S/R15E-33P	Bimonthly	MPG
	W-42	T13S/R15E-4	Bimonthly	MPG
	W-53	T13S/R15E-21	Bimonthly	MPG
	W-74	T13S/R15E-7	Bimonthly	MPG
	W-77	T13S/R15E-15	Bimonthly	MPG
	W-78	T13S/R15E-16	Bimonthly	MPG
	W-89	T13S/R15E-2	Bimonthly	MPG
	W-91	T12S/R15E-33	Bimonthly	MPG
	W-94	T13S/R15E-22	Bimonthly	MPG
	W-95	T13S/R15E-25	Bimonthly	MPG
	MW-2	T13S/R15A-25	Bimonthly	MPG
	MW-3	T13S/R15E-16	Bimonthly	MPG
	MW-4	T13S/R15E-3	Bimonthly	MPG
	MW-5	T12S/R15E-33	Bimonthly	MPG
<b>Spreckels Sugar Co.</b>	MW-1	T14S/R15E-4Q	Bimonthly	MPG
	MW-3	T14S/R15E-4H	Bimonthly	MPG
	MW-6	T13S/R15E-34N	Bimonthly	MPG
	MW-10	T13S/R15E-34	Bimonthly	MPG
	MW-11	T13S/R15E-34N	Bimonthly	MPG
	MW-14	T13S/R15E-33F	Bimonthly	MPG
	MW-32	T13S/R15E-35	Bimonthly	MPG
<b>City of Mendota</b>	No. 2	T13S/R15E-30	Bimonthly	MPG
	18Q North	T13S/R15E-18	Bimonthly	MPG
<b>USGS</b>	31J3	T13S/R15E-31J3	Continuous	MPG
	31J4	T13S/R15E-31J4	Bimonthly	MPG
	31J5	T13S/R15E-31J5	Bimonthly	MPG
	31J6	T13S/R15E-31J6	Bimonthly	MPG
	10A1	T14S/R14E-10A1	Semi-annual	WWD
	10A2	T14S/R14E-10A2	Semi-annual	WWD
	10A3	T14S/R14E-10A3	Semi-annual	WWD
	10A4	T14S/R14E-10A4	Semi-annual	WWD

**Table B-3. Groundwater Level Monitoring Network**

Owner	Well ID	State Well Number	Frequency	Entity <sup>1</sup>
<b>Hansen Farms</b>	7C1	T14S/R15E-7C1	Bimonthly	MPG
<b>Meyers Farming</b>	S-2	T14S/R15E-5	Bimonthly	MPG
	P-6	T14S/R15E-8Q	Bimonthly	MPG
	MF-1	T13S/R15E-33Q	Monthly	MF
	MF-2	T13S/R15E-33L	Monthly	MF
	MF-3	T14S/R15E-4C	Monthly	MF
	MF-4	T14S/R15E-4A	Monthly	MF
	MF-5	T14S/R15E-4F	Monthly	MF
	MF-6	T14S/R15E-4G	Monthly	MF
	MF-7	T14S/R15E-4K	Monthly	MF
	MF-8	T14S/R15E-3L	Monthly	MF
	MF-9	T14S/R15E-4H	Monthly	MF
<b>Non-MPG Wells (East of Chowchilla Bypass)</b>				
<b>North of study area</b>				
El Paco Ranch	No.54	T12S/R16E-16R1	Semi-annual	USBR
<b>Aliso Water District</b>				
Woolf Enterprises	WE-51	T13S/R16E-19K1	Bimonthly	MPG
Woolf Enterprises	WE-75	T13S/R16E-18H1	Bimonthly	MPG
Denis Prosperi	DP-2	T12S/R16E-31G1	Bimonthly	MPG
Denis Prosperi	DP-4	T12S/R16E-31A	Bimonthly	MPG
Lyon Packing	LP-11	T13S/R16E-5C1	Semi-annual	USBR
Giffen Ranch	GIF-23	T13S/R16E-8H1	Semi-annual	USBR
Groefsema Ranches	GR-28	T13S/R16E-14H2	Semi-annual	USBR
Golden State Vinters	GSV-H	T13S/R16E-16D2	Semi-annual	USBR
Woolf Enterprises	WE-53	T13S/R16E-30A1	Semi-annual	USBR
Golden State Vinters	GSV-646	T13S/R16E-20J1	Semi-annual	USBR
<b>Gravelly Ford WD</b>				
John Simpson	NA	T12S/R16E-25A1	Bimonthly	MPG
John Simpson	NA	T12S/R16E-26H1	Bimonthly	MPG
<b>Undistricted (Fresno County)</b>				
Schaad	NA	T13S/R16E-22J1	Semi-annual	USBR
Schaad	NA	T13S/R16E-22J2	Semi-annual	USBR
Schaad	NA	T13S/R16E-27A2	Semi-annual	USBR
Schaad	No.3	T13S/R16E-27F1	Semi-annual	USBR
NA	NA	T13S/R16E-29F1	Semi-annual	USBR
Larry Shehadey Farms	NA	T13S/R16E-30L3	Semi-annual	USBR
Larry Shehadey Farms	NA	T13S/R16E-30Q1	Semi-annual	USBR
Larry Shehadey Farms	NA	T13S/R16E-32F1	Semi-annual	USBR
Larry Shehadey Farms	NA	T13S/R16E-33B2	Semi-annual	USBR
Larry Shehadey Farms	NA	T13S/R16E-33F1	Semi-annual	USBR
<b>Undistricted (Fresno County)</b>				
Larry Shehadey Farms	NA	T13S/R16E-33L1	Semi-annual	USBR

**Table B-3. Groundwater Level Monitoring Network**

<b>Owner</b>	<b>Well ID</b>	<b>State Well Number</b>	<b>Frequency</b>	<b>Entity<sup>1</sup></b>
Donald Horner	NA	T13S/R16E-34C1	Bimonthly	MPG
Agape Farms	NA	T13S/R16E-34C2	Semi-annual	USBR
Agape Farms	NA	T13S/R16E-34D1	Semi-annual	USBR
Agape Farms	NA	T13S/R16E-34P2	Semi-annual	USBR
Connolly	NA	T14S/R16E-3F1	Semi-annual	USBR
Duran	NA	T14S/R16E-3P1	Semi-annual	USBR
Larry Shehadey Farms	NA	T14S/R16E-4L1	Semi-annual	USBR
Bar 20 Partners Ltd.	NA	T14S/R16E-5J1	Semi-annual	USBR
Bar 20 Partners Ltd.	NA	T14S/R16E-5L2	Semi-annual	USBR
Bar 20 Partners Ltd.	NA	T14S/R16E-6B1	Semi-annual	USBR

1. MPG = Mendota Pool Group, CCID = Central California Irrigation District, NLF = Newhall Land & Farming, USBR = U.S. Bureau of Reclamation, WWD = Westlands Water District, MF = Meyers Farming

**Table B-4. Groundwater Quality Monitoring Network**

Owner	Well ID	Depth Zone	Sampling Schedule <sup>1</sup>		Responsible Entity <sup>2</sup>
			Annual	Biennial	
<b>MPG Wells</b>					
<b>Fordel, Inc.</b>	M-1	D	Complete	-	MPG
	M-2	S	Complete	-	MPG
	M-3	S	Complete	-	MPG
	M-4	S	Complete	-	MPG
	M-5	S	EC/TDS	Complete	MPG
	M-6	S	Complete	-	MPG
<b>Terra Linda Farms</b>	TL-1	D	EC/TDS	Complete	MPG
	TL-2	D	EC/TDS	Complete	MPG
	TL-3	D	EC/TDS	Complete	MPG
	TL-4A	S	EC/TDS	Complete	MPG
	TL-4C	S	Complete	-	MPG
	TL-5	D	EC/TDS	Complete	MPG
	TL-7	D	EC/TDS	Complete	MPG
	TL-8	D	EC/TDS	Complete	MPG
	TL-10A	S	Complete	-	MPG
	TL-10B	S	EC/TDS	Complete	MPG
	TL-10C	S	EC/TDS	Complete	MPG
	TL-11	S	EC/TDS	Complete	MPG
	TL-12	S	EC/TDS	Complete	MPG
	TL-13	S	EC/TDS	Complete	MPG
	TL-14	S	Complete	-	MPG
	TL-15	S	EC/TDS	Complete	MPG
	TL-16	S	EC/TDS	Complete	MPG
	TL-17	S	Complete	-	MPG
<b>Silver Creek Packing</b>	SC-3B	S	EC/TDS	Complete	MPG
	SC-4B	S	EC/TDS	Complete	MPG
	SC-6	D	EC/TDS	Complete	MPG
<b>Coelho/Gardner/Hanson</b>	CGH-1A	S	EC/TDS	Complete	MPG
	CGH-1B	S	EC/TDS	Complete	MPG
	CGH-1C	S	EC/TDS	Complete	MPG
	CGH-2	S	EC/TDS	Complete	MPG
	CGH-6A	S	Complete	-	MPG
	CGH-6B	S	Complete	-	MPG
	CGH-6C	S	EC/TDS	Complete	MPG
	CGH-6D	S	EC/TDS	Complete	MPG
	CGH-7	S	EC/TDS	Complete	MPG
	CGH-9	S	EC/TDS	Complete	MPG
<b>Meyers Farming</b>	MS-5	D	EC/TDS	Complete	MPG
	MS-7	S	EC/TDS	Complete	MPG
<b>Five Star/Conejo Farms</b>	FS-1	S	EC/TDS	Complete	MPG
	FS-2	S	EC/TDS	Complete	MPG
	FS-3	S	EC/TDS	Complete	MPG
	FS-4	S	EC/TDS	Complete	MPG

**Table B-4. Groundwater Quality Monitoring Network**

Owner	Well ID	Depth Zone	Sampling Schedule <sup>1</sup>		Responsible Entity <sup>2</sup>
			Annual	Biennial	
<b>Five Star/Conejo Farms</b>	FS-5	S	Complete	-	MPG
	FS-6	S	EC/TDS	Complete	MPG
	FS-7	S	EC/TDS	Complete	MPG
	FS-8	S	EC/TDS	Complete	MPG
	FS-9	S	EC/TDS	Complete	MPG
	FS-10	S	Complete	-	MPG
<b>Coelho West</b>	CW-1	S	Complete	-	MPG
	CW-2	S	Complete	-	MPG
	CW-3	S	Complete	-	MPG
	CW-4	S	Complete	-	MPG
	CW-5	S	Complete	-	MPG
<b>Farmers Water District</b>	R-1	D	Complete	-	MPG
	R-2	D	EC/TDS	Complete	MPG
	R-3	D	Complete	-	MPG
	R-4	D	EC/TDS	Complete	MPG
	R-6	D	EC/TDS	Complete	MPG
	R-7	D	EC/TDS	Complete	MPG
	R-8	D	EC/TDS	Complete	MPG
	R-9	D	EC/TDS	Complete	MPG
	R-10	D	EC/TDS	Complete	MPG
	R-11	D	Complete	-	MPG
	BF-1	D	EC/TDS	Complete	MPG
<b>Baker Farming Co.</b>	BF-2	D	EC/TDS	Complete	MPG
	BF-3	D	EC/TDS	Complete	MPG
	BF-4	D	EC/TDS	Complete	MPG
	BF-5	D	EC/TDS	Complete	MPG
	PDCF-1	D	EC/TDS	Complete	MPG
<b>Non MPG Wells</b>					
<b>Central California ID</b>	5A	D	Gen. Min.	-	CCID
	12C	D	Gen. Min.	-	CCID
	15B	D	Gen. Min.	-	CCID
	23B	D	Gen. Min.	-	CCID
	32B	D	Gen. Min.	-	CCID
	35A	D	Gen. Min.	-	CCID
	38A	D	Gen. Min.	-	CCID
<b>Columbia Canal Company</b>	CC-1	D	EC/TDS	Irr. Suitability	CCC
	CC-2	D	EC/TDS	Irr. Suitability	CCC
	Cardella-1	D	EC/TDS	Irr. Suitability	CCC
	Cardella-2 (Lopes-1)	D	EC/TDS	Irr. Suitability	CCC
	Elrod-1	D	EC/TDS	Irr. Suitability	CCC
	Elrod-2	D	EC/TDS	Irr. Suitability	CCC
	Burkhart-Heirs	D	EC/TDS	Irr. Suitability	CCC
	DMA	D	EC/TDS	Irr. Suitability	CCC
	Davis	D	EC/TDS	Irr. Suitability	CCC
	Garcia-1	D	EC/TDS	Irr. Suitability	CCC

**Table B-4. Groundwater Quality Monitoring Network**

Owner	Well ID	Depth Zone	Sampling Schedule <sup>1</sup>		Responsible Entity <sup>2</sup>
			Annual	Biennial	
<b>Columbia Canal Company</b>	Garcia-2	D	EC/TDS	Irr. Suitability	CCC
	Garcia-3	D	EC/TDS	Irr. Suitability	CCC
	Garcia-4	D	EC/TDS	Irr. Suitability	CCC
	Garcia-5	D	EC/TDS	Irr. Suitability	CCC
	Snyder	D	EC/TDS	Irr. Suitability	CCC
<b>B&amp;B Ranch</b>	Mowry Diesel	D	EC/TDS	Irr. Suitability	CCC
<b>Newhall Land &amp; Farming</b>	W-32	D	Irr. Suitability/Se	-	NLF
	W-42	D	Irr. Suitability/Se	-	NLF
	W-53	D	Irr. Suitability/Se	-	NLF
	W-74	D	Irr. Suitability/Se	-	NLF
	W-78	D	Irr. Suitability/Se	-	NLF
	W-89	D	Irr. Suitability/Se	-	NLF
	W-91	D	Irr. Suitability/Se	-	NLF
	W-94	D	Irr. Suitability/Se	-	NLF
	W-95	D	Irr. Suitability/Se	-	NLF
	MW-1	D	Irr. Suitability/Se	-	NLF
	MW-2	S	Irr. Suitability/Se	-	NLF
	MW-3	S	Irr. Suitability/Se	-	NLF
	MW-4	S	Irr. Suitability/Se	-	NLF
	MW-5	S	Irr. Suitability/Se	-	NLF
<b>Spreckels Sugar Co.</b>	MW-1	S	Gen. Min./TE/Ba	-	SSC
	MW-2	S	Gen. Min./TE/Ba	-	SSC
	MW-3	S	Gen. Min./TE/Ba	-	SSC
	MW-4	S	Gen. Min./TE/Ba	-	SSC
	MW-5	S	Gen. Min./TE/Ba	-	SSC
	MW-6	S	Gen. Min./TE/Ba	-	SSC
	MW-7	D	Gen. Min./TE/Ba	-	SSC
	MW-8	D	Gen. Min./TE/Ba	-	SSC
	MW-9	S	Gen. Min./TE/Ba	-	SSC
	MW-10	D	Gen. Min./TE/Ba	-	SSC
	MW-11	D	Gen. Min./TE/Ba	-	SSC
	MW-12	D	Gen. Min./TE/Ba	-	SSC
	MW-13	S	Gen. Min./TE/Ba	-	SSC
	MW-14	D	Gen. Min./TE/Ba	-	SSC
	MW-15	S	Gen. Min./TE/Ba	-	SSC
	MW-16	D	Gen. Min./TE/Ba	-	SSC
	MW-17	S	Gen. Min./TE/Ba	-	SSC
	MW-18	S	Gen. Min./TE/Ba	-	SSC
	MW-19	S	Gen. Min./TE/Ba	-	SSC
	MW-20	S	Gen. Min./TE/Ba	-	SSC
	MW-21	S	Gen. Min./TE/Ba	-	SSC
	MW-22	D	Gen. Min./TE/Ba	-	SSC
	MW-23	S	Gen. Min./TE/Ba	-	SSC
	MW-24	S	Gen. Min./TE/Ba	-	SSC
	MW-25	S	Gen. Min./TE/Ba	-	SSC
	MW-26	S	Gen. Min./TE/Ba	-	SSC

**Table B-4. Groundwater Quality Monitoring Network**

Owner	Well ID	Depth Zone	Sampling Schedule <sup>1</sup>		Responsible Entity <sup>2</sup>
			Annual	Biennial	
<b>Spreckels Sugar Co.</b>	MW-27	S	Gen. Min./TE/Ba	-	SSC
	MW-28	S	Gen. Min./TE/Ba	-	SSC
	MW-29	S	Gen. Min./TE/Ba	-	SSC
	MW-30	S	Gen. Min./TE/Ba	-	SSC
	MW-31	S	Gen. Min./TE/Ba	-	SSC
	MW-32	S	Gen. Min./TE/Ba	-	SSC
	PW-1	D	Gen. Min./TE/Ba	-	SSC
	PW-4	D	Gen. Min./TE/Ba	-	SSC
	PW-6	D	Gen. Min./TE/Ba	-	SSC
	PW-7	D	Gen. Min./TE/Ba	-	SSC
	PW-8	D	Gen. Min./TE/Ba	-	SSC
	PW-9	D	Gen. Min./TE/Ba	-	SSC
	PW-10	D	Gen. Min./TE/Ba	-	SSC
	PW-11	D	Gen. Min./TE/Ba	-	SSC
<b>City of Mendota</b>	No. 3	D	Gen. Min./TE	-	City
	No. 4	D	Gen. Min./TE	-	City
	No. 5	D	Gen. Min./TE	-	City
	No. 7	D	Gen. Min./TE	-	City
	No. 8	D	Gen. Min./TE	-	City
	No. 9	D	Gen. Min./TE	-	City
<b>USGS</b>	31J4	S	Complete	-	MPG
	31J5	D	Complete	-	MPG
<b>Meyers Farming</b>	S-1	S	Complete	-	MPG
	S-2	S	Complete	-	MPG
	S-3	S	Complete	-	MPG
	P-1	S	Complete	-	MPG
	P-4	S	Complete	-	MPG
	MF-1	S	Gen. Min./TE	-	MF
	MF-2	S	Gen. Min./TE	-	MF
	MF-3	S	Gen. Min./TE	-	MF
	MF-4	S	Gen. Min./TE	-	MF
	MF-5	S	Gen. Min./TE	-	MF
	MF-6	S	Gen. Min./TE	-	MF
	MF-7	S	Gen. Min./TE	-	MF
	MF-8	S	Gen. Min./TE	-	MF
	MF-9	S	Gen. Min./TE	-	MF

1. Gen. Min. = general minerals; typically consists of anions (sulfate, chloride, bicarbonate, alkalinity, nitrate, and fluoride) and cations (calcium, magnesium, sodium, potassium, boron, copper, iron, manganese, and zinc), EC/TDS, and pH.

EC/TDS = electrical conductivity, total dissolved solids

Irr. Suitability = Irrigation Suitability; typically includes general minerals and sodium adsorption ratio.

TE = trace elements; typically includes arsenic, molybdenum, and selenium. Barium is also included for certain samples.

Complete = includes general minerals and trace elements.

2. MPG = Mendota Pool Group, CCID = Central California Irrigation District, NLF = Newhall Land & Farming,

CCC = Columbia Canal Company, SSC = Spreckels Sugar Co., City = City of Mendota,

MF = Meyers Farming

**Table B-5. Analytical Methods and Detection Limits for Water Quality Analyses**

Analyte	Lab <sup>1</sup>	Type <sup>2</sup>	Value	Units	Method
Arsenic	FGL	PQL	2	mg/L	200.8
Bicarbonate	FGL	PQL	10	mg/L	2320B
Boron	FGL	PQL	0.05	mg/L	200.7
Calcium	FGL	PQL	1	mg/L	200.7
Carbonate	FGL	PQL	10	mg/L	2320B
Chloride	FGL	PQL	1	mg/L	300.1
Copper	FGL	PQL	10	mg/L	200.7
Fluoride	FGL	PQL	0.1	mg/L	300.1
Hydroxide	FGL	PQL	10	mg/L	2320B
Iron	FGL	PQL	50	mg/L	200.7
Magnesium	FGL	PQL	1	mg/L	200.7
Manganese	FGL	PQL	10	mg/L	200.7
Molybdenum	OBL	DL	1	µg/L	ICP OES
Nitrate	FGL	PQL	0.1	mg/L	4500NO3F
Nitrite as N	FGL	PQL	0.1	mg/L	300.0
Potassium	FGL	PQL	1	mg/L	200.7
Selenium	OBL	DL	0.4	µg/L	AFS
Sodium	FGL	PQL	1	mg/L	200.7
Electrical Conductivity	FGL	PQL	1	µmhos/cm	2510B
Sulfate	FGL	PQL	1	mg/L	300.0
Total Alkalinity (as CaCO <sub>3</sub> )	FGL	PQL	10	mg/L	2320B
Total Dissolved Solids	FGL	PQL	40	mg/L	2540
Total Hardness	FGL	PQL	2.5	mg/L	200.7
Zinc	FGL	PQL	20	mg/L	200.7

1. Laboratories planned to be used in 2003. The MPG may elect to use other laboratories that meet or exceed the data quality objectives.

FGL = Fruit Growers Laboratory, Santa Paula, CA; OBL = Olson Biochemistry Laboratories, Brookings, SD

2. DL = Detection Limit, PQL = Practical Quantitation Limit

**Table B-6. Surface Water Quality Monitoring Network**

Sample Location	Grab Sampling <sup>1</sup>				Continuous Logging Analysis and Entity <sup>3</sup>
	Semi-Annual	Entity <sup>2</sup> Monitoring	Monthly	Entity <sup>2</sup> Monitoring	
Columbia Canal	Irr. Suit., As, Mo, Se	MPG	EC, B, Se	SJREC	EC (SJREC)
Mendota Dam	Irr. Suit., As, Mo, Se	MPG	-	-	-
CCID Main Canal	Irr. Suit., As, Mo, Se	MPG	EC, B, Se EC, Se	SJREC USBR	EC (SJREC) & B, Se (USBR)
Mowry Bridge	Irr. Suit., As, Mo, Se	MPG	-	-	-
Delta-Mendota Canal (at Bass Avenue, Check 21)	Irr. Suit., As, Mo, Se	MPG	Irr. Suit. EC, Se	MPG USBR	EC, B, Se (USBR)
CCID Outside Canal	Irr. Suit., As, Mo, Se	MPG	EC, B, Se EC, Se	SJREC USBR	EC (SJREC)
Firebaugh Intake Canal	Irr. Suit., As, Mo, Se	MPG	EC, B, Se	SJREC	EC (SJREC)
West of Fordel	Irr. Suit., As, Mo, Se	MPG	-	-	-
Etchegoinberry	Irr. Suit., As, Mo, Se	MPG	-	-	-
Mendota Wildlife Area <sup>4</sup>	Irr. Suit., As, Mo, Se	MPG	Irr. Suit.	MPG	EC (MPG)
James ID Booster Plant	Irr. Suit., As, Mo, Se	MPG	Irr. Suit.	MPG	EC (JID)
Tranquillity ID Intake	Irr. Suit., As, Mo, Se	MPG	-	-	-
Lateral 6&7	Irr. Suit., As, Mo, Se	MPG	Irr. Suit.	MPG	-

1. Irr. Suit. = Irrigation Suitability; typically includes general minerals and sodium adsorption ratio.

EC = electrical conductivity, As = arsenic, B = boron, Mo = molybdenum, Se = selenium

2. MPG = Mendota Pool Group, USBR = U.S. Bureau of Reclamation, SJREC = San Joaquin River Exchange Contractors

3. USBR collects daily composite samples with automated equipment. Samples are picked up once a week.

JID = James Irrigation District

4. Approximately one mile south of Whites Bridge.

**Table B-7. Sediment Quality Monitoring Network**

Sample Location	Sediment Sampling Frequency	Analyses <sup>1</sup>	Monitoring Entity
Columbia Canal	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
Mendota Dam	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
Delta-Mendota Canal	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
Firebaugh Intake Canal	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
Etchegoinberry	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
Mendota Wildlife Area <sup>2</sup>	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
James ID Booster Plant	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG
Lateral 6&7	Annual	As, B, Mo, Se, EC, TOC, CEC, GSD, pH	MPG

1. As = arsenic, B = boron, Mo = molybdenum, Se = selenium, EC = electrical conductivity, CEC = cation exchange capacity  
GSD = grain size distribution (fraction of sands, silts and clays in the sediment sample)

2. Approximately one quarter mile south of Whites Bridge.

**Table B-8. Analytical Methods and Detection Limits for Sediment Quality Analyses**

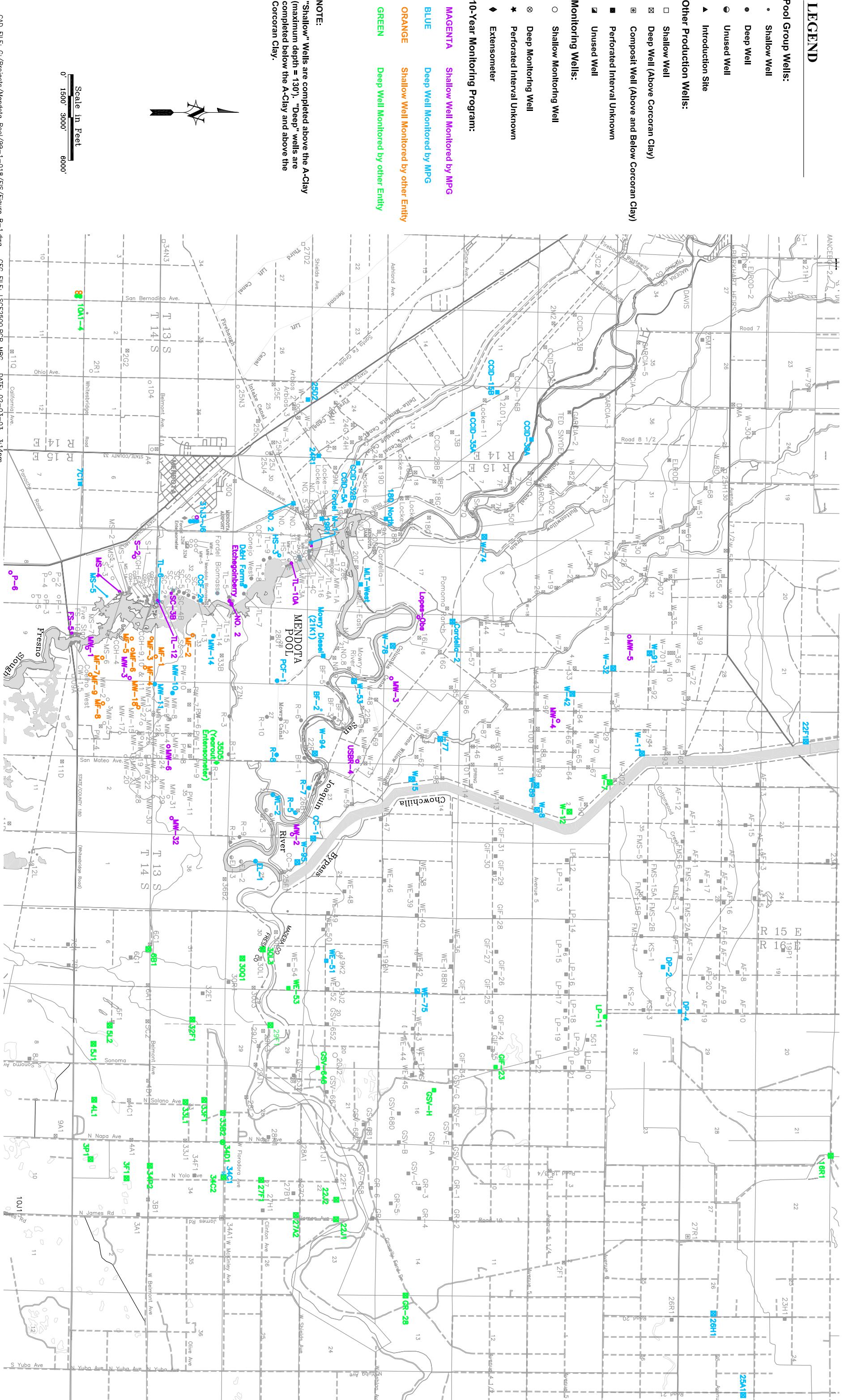
Analyte	Lab <sup>1</sup>	Limit <sup>2</sup>	Value	Units	Method
Arsenic	CAS	lowest MRL	0.9	mg/kg	7060A
Boron	CAS	lowest MRL	9	mg/kg	6010B
Cation Exchange Capacity	CAS	MRL	0.2-0.4	meq/100g	7770
Molybdenum	CAS	MRL	1.8	mg/kg	6010B
Selenium	CAS	lowest MRL	1.8	mg/kg	7740
Electrical Conductivity	CAS	MRL	2	umhos/cm	OSU
Total Organic Carbon	CAS	MRL	0.05	%	ASTM D4129-82M
Grain Size Distribution	CAS		0.01	%	ASTM D422

1. Laboratory planned to be used in 2003. The MPG may elect to use other laboratories that meet or exceed the data quality objectives.

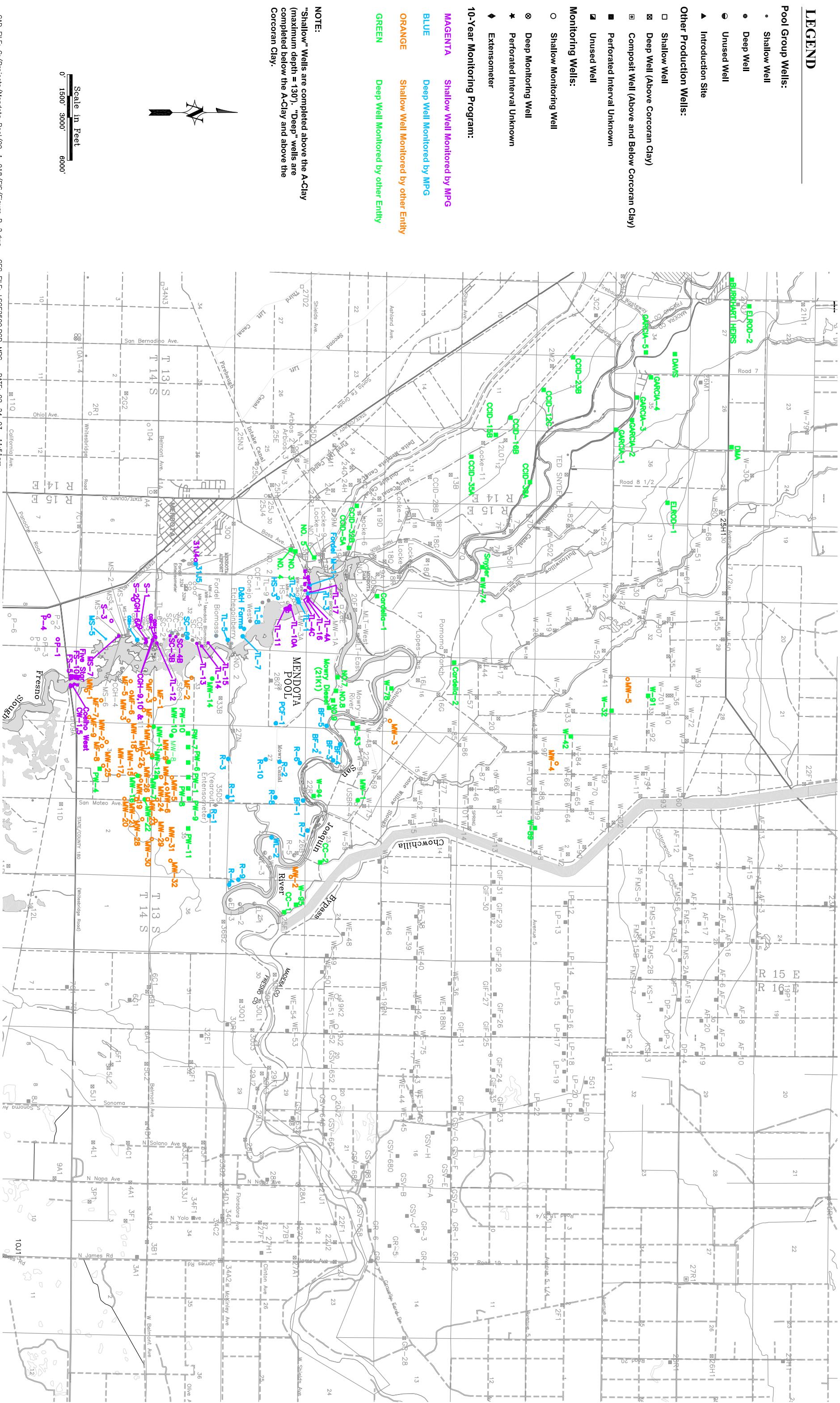
CAS = Columbia Analytical Services, Kelso, WA.

2. MRL = Method Reporting Limit; MDL = Method Detection Limit

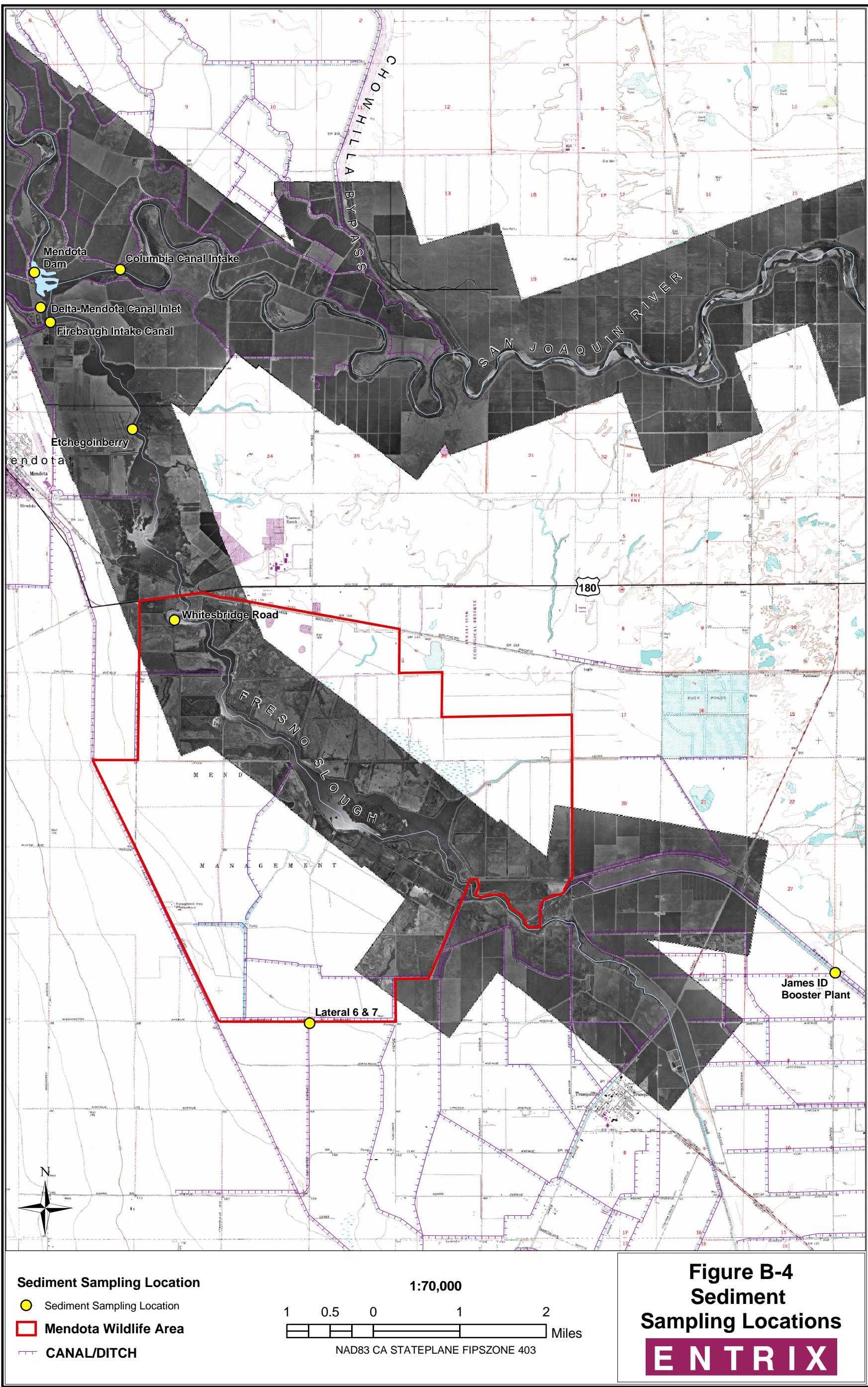
## LEGEND



## LEGEND



**Figure B-3 Surface Water Sampling Locations**  
Hard Copy Only



## Attachment 1.

### Sample Collection and Quality Control Procedures for Water and Sediment Samples

The following sections present recommended sample collection and field and laboratory quality control (QC) procedures for collection and analysis of water (including surface and groundwater) and sediment samples for the Mendota Pool monitoring program. Following these procedures will ensure data quality and data usability.

#### ***SAMPLE COLLECTION PROCEDURES***

Surface water, groundwater, and sediment samples will be collected and analyzed for various constituents as described in this Appendix and summarized in Tables B-4, B-6, and B-7. Analytical methods and required detection limits are summarized in Tables B-5 and B-8.

#### ***SURFACE WATER AND SEDIMENT SAMPLING***

Sampling equipment for surface water sample collection includes a non-disposable bailer or bucket for purposes of collecting grab samples. The surface water sampling equipment is rinsed between locations with laboratory-quality water (i.e., potable water that is chemically characterized to ensure the rinse water does not effect the results of trace level analyses for such constituents as selenium; this water is not chlorinated).

Sediment samples are collected from a boat using an Ekman dredge. Sediment for analysis is collected from the top 2 cm of the sediment collected by the dredge. Multiple deployments of the dredge may be necessary to obtain sufficient sample for each replicate. Sampling equipment is washed and rinsed with laboratory-quality water between each replicate.

#### ***GROUNDWATER PURGING AND SAMPLING***

Groundwater samples are most often collected from water supply wells that are equipped with permanent pumping equipment. Some wells in the water quality monitoring program have been constructed specifically for monitoring purposes and are small-diameter wells completed to varying depths, ranging from near or at the water table to below the Corcoran Clay. These wells are sampled with portable submersible pumping equipment, except for the Spreckels Sugar Co. monitoring wells, which are equipped with permanent submersible pumps.

Prior to sampling a well, the well is purged to remove groundwater that has been in the casing. While there is a gradient that moves groundwater through the well structure where the well is perforated, the quality of the water in the casing is subject to changes in composition due to atmospheric exposure and other factors. Purging typically includes the removal of three casing volumes of water prior to sample collection, but there are many additional factors that can be considered when determining whether sufficient purging has occurred. The best approach to making this determination is by monitoring the stabilization of a few simple water quality parameters during purging operations. Typically, at least three indicator parameters are measured; these include electrical conductivity (EC), pH, and temperature. Discharge water is collected in a beaker (with a volume of about 0.5 liter) to allow measurement with a portable field meter. Depending upon the field instrumentation, all three parameters (EC, pH and temperature) can be measured simultaneously. The field

instrument is calibrated daily in accordance with the procedures specified in the instrument's manual.

When wells are sampled on behalf of the MPG, the indicator readings and field observations are recorded on a field data sheet. In addition to indicator parameter measurements, other measurements are periodically recorded, including measurement time and pumping rate (primarily to track the volume of water removed during purging operations); pumping water level measurements are sometimes recorded, but are not necessary for the purposes of this project. The field observations include turbidity (particulate matter) measurements, which are particularly useful when evaluating trends in total metals concentrations because samples collected from supply wells or monitoring wells that have variable turbidity depending upon well construction, use, or other factors may influence the observed total metals/trace elements concentrations. In the absence of a field meter to quantify turbidity, visual observation and field notations are helpful for identifying atypical groundwater conditions. The sampler will note whether the water is clear or cloudy (turbid) at the outset of purging operations and whether the water clears during purging operations (the degree of clarity when purging operations are complete should be noted).

As indicated above, portable submersible pumps are used to sample many of the monitoring wells. Because the focus of the sampling program is primarily on salinity and associated constituents and selected trace elements, purging operations are sufficient to remove residual water from the pump and tubing that remained from the previously sampled well. No other special cleaning operations are required.

Samples collected from water supply wells in the network that have been idle prior to a sampling event have similar purging requirements to those described above. Sampling events for water supply wells are preferably coordinated with the pumping period, so purging becomes less necessary and sampling can be expedited. It is important that the well identification be noted (well clusters have in the past resulted in questionable data sources). It is also important that the samples be collected at the wellhead to the extent possible. If the sampling point is located away from the wellhead, care should be taken to ensure that the sampling point (spigot, tubing, pipe, etc.) has been flushed with the water to be sampled and that field parameters are measured and turbidity measured and/or noted.

Purging is conducted until field parameters stabilize. Stabilization is defined as three consecutive readings at 5-minute intervals where parameters do not vary by more than 5 percent. If parameters have not sufficiently stabilized, purging should continue. The sampling and purging data collected as part of the project provide a useful indication of purging requirements for future sampling events. Unless extraordinary circumstances are encountered, not more than ten casing volumes will be purged. Monitoring well samples will be collected while pumping at a slow rate (less than 0.1 gpm).

#### ***CONTAINERS AND PRESERVATION***

Sample containers and preservation for metals analyses (including selenium and molybdenum) are summarized in Table 1. Due to the potential of contaminating the samples with boron from borosilicate glass, at no time should water or sediment samples contact glass, glass wool, or filter materials containing glass.

**Table 1. Required Sample Containers, Preservation, and Holding Times for Water and Sediment Samples**

<u>ANALYTE</u>	<u>SAMPLE MATRIX</u>	<u>CONTAINER</u>	<u>PRESERVATIVE</u>	<u>Holding Time<sup>a</sup></u>
Metals, Total	Water	P/G	Add HNO <sub>3</sub> to 10% v/v	6 months
Cations	Water	P/G(B)	Refrigerate	24 hours
Anions	Water	P	None or refrigerate	28 days
Electrical Conductivity	Water	P/G	Refrigerate	28 days
Total Dissolved Solids (TDS)	Water	P/G	Refrigerate	7 days (regulatory: 14 days)
pH	Water	P/G	Analyze as soon as possible	24 hours
Hydroxide	Water			
Nitrite as N	Water	P/G	Analyze as soon as possible	None (regulatory: 10 days)
Total hardness	Water	P/G	Add HNO <sub>3</sub> to 10% v/v	6 months
<hr/>				
Metals, Total	Sediment	P/G	Cool, 4°C	6 months
Grain Size	Sediment	P/G	Cool, 4°C	6 months
Electrical Conductivity	Sediment	P/G	Refrigerate	28 days
Cation Exchange Capacity	Sediment			
Total Organic Carbon (TOC)	Sediment	P/G	Cool, 4°C	28 days

Notes:

1. P = Polyethylene
2. G = Glass
3. G(B) = Glass/borosilicate

## ***QUALITY CONTROL PROCEDURES***

The following sections present recommended field and laboratory QC checks for the sampling and analysis activities. A discussion of field QC samples, frequency of collection, and acceptance criteria is included. A discussion of laboratory QC samples and analyses follows.

### ***FIELD QC SAMPLES***

The recommended type and frequency of field QC samples to be collected are summarized in Table 2 and described below.

#### ***FIELD (SOURCE WATER) BLANKS***

Field blanks are samples of the water source (laboratory-quality water) used for decontamination. This blank is used to monitor for potential contaminants introduced from the water source used to rinse equipment during field sampling activities. Due to the low level target values established as Refuge Water Quality Objectives by CDFG, these blanks are considered important for evaluation of the surface water quality results in order to ensure that the rinse water does not contain levels of the target compounds that would result in non-representative grab samples and apparent exceedance of established target concentrations. Field blanks will not be collected for groundwater quality samples.

Typically, at least one sample for each source of water or one field blank per lot number of laboratory-quality water for a specified event will be collected and analyzed for the same parameters as the corresponding field environmental samples.

#### ***DUPLICATE (BLIND) FIELD SAMPLES***

“Blind” duplicate field samples are collected to monitor the precision of the field sampling process. Duplicates will be collected for surface water and groundwater samples; they will not be collected for sediment samples because the inherent variability of those samples precludes obtaining a true duplicate. The true identity of the duplicate sample is not noted on the chain of custody form, rather a unique identifier is provided. It is recommended that blind duplicates be collected from at least 5 percent of the total number of sample locations (i.e., a duplicate sample would be collected from one of the thirteen surface water sampling stations during each event and approximately four samples would be collected in duplicate from the wells sampled by the MPG during any one sampling year). It is best to choose locations that are known or suspected to contain moderate levels of the analytes of interest so that detected levels can be compared for precision.

The identities of the duplicate samples are recorded in the field-sampling logbook, and this information is forwarded to the data quality evaluation team to aid in reviewing the data quality. The sources (locations) of the blind field duplicates will not be revealed to the laboratory. Each blind field duplicate sample will have a unique sample identification number on the chain of custody form sent to the laboratory such that the laboratory cannot determine its source.

**Table 2. Field QC Samples For Precision and Accuracy**

Type of QC Sample	Frequency
Equipment rinsate blank – Total metals	1 per surface water sampling event
Field (rinse water source) blank	1 per rinse water source
Field “blind” duplicate	5 percent of samples collected per event (i.e., 1 for each sw sampling event and about 4 for the groundwater sampling conducted during the year by the MPG)

Note: Duplicates to be collected from surface water and groundwater samples only. The inherent variability of sediment samples precludes obtaining a true duplicate sample for assessment of precision.

### ***LABORATORY QUALITY CONTROL REQUIREMENTS***

#### ***Laboratory Responsibilities***

The laboratory should report quality control data with each analytical batch or sample delivery group, which is not to exceed 20 samples. At a minimum, the laboratory should analyze and report results for a method or procedural blank, a laboratory duplicate, and a laboratory control spike for selected analytes (particularly for trace elements with low-level detection limits) and each sample delivery group. These results should be reported with the sample results, and the QC data sheets or the report narrative should include the acceptance criteria for these analyses. Before the laboratory releases each data package, the laboratory must carefully review the sample and laboratory performance QC data to verify sample identity and also the completeness and accuracy of the sample and QC data. An explanation of any QC data that do not meet acceptance criteria and any corrective actions taken by the laboratory should be included in the data report.

#### ***Review of Laboratory Data Reports***

Data validation should include a data completeness check of each data package and a thorough review of all laboratory reporting forms. Specifically, this review should include:

- Review of data package completeness;
- Review of the required reporting summary forms to determine if the QC requirements were met and to determine the effect of exceeded QC requirements on the precision, accuracy, and sensitivity of the data;
- Review of the overall data package to determine if contractual requirements were met;
- Review of additional quality assurance (QA) and QC parameters, such as field blank contamination, to determine technical usability of the data; and

- Application of standard data quality qualifiers to the data.

In addition, each data validation should include a comprehensive review of the following QA/QC parameters as indicated in the National Functional Guidelines:

- Holding times (to assess potential for degradation that would affect accuracy);
- Blanks (to assess contamination for all compounds);
- Internal Standards (to assess method accuracy and sensitivity);
- Target Compound Identification;
- Compound Reporting Limits and Method Detection Limits (to assess sensitivity as compared to project-specific requirements).

Data validation is partially based on best professional judgment. In order to achieve consistent data validation, data worksheets should be completed for each data validation effort. A data review worksheet is a summary form on which the data reviewer records data validation notes and conclusions specific to each analytical method. The worksheets will help the reviewer to track and summarize the overall quality of the data. Sample results will then be qualified as appropriate, following EPA protocols. Samples that do not meet the acceptance limit criteria will be indicated with a qualifying flag, which is a one or two-letter abbreviation that indicates a problem with the data (Table 3).

**Table 3. Data Validation Qualifiers**

<b>Qualifier</b>	<b>Explanation of Qualifier</b>
U	The compound was analyzed for, but was not detected above the reported method detection limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
UJ	The analyte was not detected above the reported method detection limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B	The analyte was positively identified; the reported concentration is greater than the instrument detection limit, but less than the QA Project Plan specified Reporting Limit.

**APPENDIX C**  
**MONITORING DATA**

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>						Cations				Anions				Trace Elements									
			EC <sup>2</sup> µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
<b>USGS</b>																									
31J4	11/21/85	USGS	3,290	1,960	8.0	-	19.9	31	29	640	3	370	720	262	<0.4	-	<1	-	1.0	-	0.25	0.21	-	-	-
31J4	04/23/87	USGS	3,270	1,830	8.4	-	16.9	34	30	560	3	360	670	273	2	-	1	-	1.0	-	0.20	0.02	-	-	-
31J4	08/02/99	FGL	5,740	3,700	7.0	-	16.5	95	99	960	7	930	1,360	260	<0.4	-	<2	-	1.4	-	0.83	1.00	-	-	-
31J4	09/28/99	FGL	5,970	3,670	6.7	-	15.6	102	108	950	9	870	1,290	280	0.6	-	<2	-	1.6	-	1.14	1.37	-	-	-
31J4	08/25/00	FGL	5,890	3,730	6.7	200	16.4	98	101	970	7	840	1,240	250	<0.8	0.6	-	-	1.4	<0.01	0.83	1.22	-	-	<0.02
31J4	06/27/01	FGL/OBL	5,940	3,490	7.0	210	15.8	101	105	950	8	910	1,240	260	<0.8	0.7	<2	-	1.43	<0.01	1.21	1.34	10	<0.4	<0.02
31J4	06/26/02	FGL	6,370	4,170	6.8	220	19.4	113	123	1,250	9	1,030	1,580	260	<0.4	0.3	<2	-	1.37	<0.01	1.74	1.71	7.6	<0.4	<0.02
10A2	08/03/99	FGL	6,750	5,590	7.5	-	4.7	640	230	540	3	2,130	930	110	770	-	20	-	3.7	-	0.57	1.23	-	-	-
10A2	09/28/99	FGL	6,960	5,750	7.2	-	4.7	670	270	570	5	2,140	970	120	762	-	2	-	4.1	-	<0.25	1.11	-	-	-
<b>Fordel, Inc.</b>																									
M-2	08/04/99	FGL	509	320	6.8	-	2.5	25	10	58	2	42	51	200	<0.4	-	<2	-	0.2	-	5.80	0.70	-	-	-
M-2	09/27/99	FGL	627	370	6.7	-	2.8	33	14	75	3	59	65	210	<0.4	-	3	-	0.3	-	7.50	1.00	-	-	-
M-2	08/23/00	FGL	1,350	780	6.7	160	8.1	35	15	226	4	201	174	190	<0.4	0.2	-	-	0.5	<0.01	8.12	1.21	-	-	<0.02
M-2	06/28/01	FGL/OBL	1,020	650	6.8	130	4.4	42	16	133	4	154	132	160	<0.4	0.1	2	-	0.36	<0.01	8.49	1.24	10	<0.4	<0.02
M-2	10/01/01	FGL/OBL	1,150	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
M-2	06/25/02	FGL/OBL	1,150	690	6.8	140	5.1	42	17	155	4	197	147	170	<0.4	<0.1	3	-	0.44	<0.01	7.66	1.27	4.2	<0.4	<0.02
M-3	04/08/93	NA	1,040	597	6.6	-	3.3	52	20	110	4	150	130	180	-	-	-	-	-	-	-	-	-	-	
M-3	06/28/01	FGL/OBL	1,390	810	6.8	160	6.4	46	18	203	4	218	184	190	<0.4	0.1	3	-	0.51	<0.01	9.27	1.35	10	<0.4	<0.02
M-3	10/01/01	FGL/OBL	1,160	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
M-4	10/01/01	FGL/OBL	1,250	760	6.7	180	5.4	49	19	177	4	196	169	220	<0.4	0.1	3	-	0.52	<0.01	8.57	1.21	5.7	<0.4	<0.02
M-5	10/01/01	FGL/OBL	769	480	6.9	160	3.4	37	16	99	3	88	101	200	<0.4	0.1	<2	-	0.35	<0.01	8.76	1.27	4.6	<0.4	<0.02
M-6	06/28/01	FGL/OBL	632	430	6.7	150	2.3	35	15	65	3	63	60	180	<0.4	0.1	<2	-	0.27	<0.01	7.59	1.07	3	<0.4	<0.02
M-6	10/01/01	FGL/OBL	629	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
M-6	06/25/02	FGL/OBL	650	390	6.7	160	2.1	36	16	61	3	43	83	190	<0.4	<0.1	3	-	0.26	<0.01	7.93	1.06	3.3	0.4	<0.02
<b>Newhall Land &amp; Farming</b>																									
MW-2	06/11/02	JML	1,090	-	7.1	-	4.0	-	-	154	-	-	74	384	17	-	-	0.17	-	-	-	-	-	-	
MW-3	06/11/02	JML	320	-	7.3	-	3.1	-	-	57	-	-	32	104	ND	-	-	0.15	-	-	-	-	-	-	
MW-4	06/11/02	JML	1,270	-	8.0	-	13.0	-	-	278	-	-	170	366	6	-	-	0.28	-	-	-	-	-	-	
MW-5	06/11/02	JML	1,060	-	7.5	-	5.3	-	-	175	-	-	124	336	5	-	-	0.25	-	-	-	-	-	-	
<b>Terra Linda Farms</b>																									
TL-4A	10/02/01	FGL/OBL	935	570	7.6	220	2.9	53	24	103	4	98	111	260	<0.4	<0.1	<2	-	0.21	<0.01	0.89	1.09	8.7	<0.4	<0.02
TL-4C	06/27/01	FGL/OBL	1,000	570	7.3	200	3.1	58	23	111	4	121	128	240	<0.4	<0.1	<2	-	0.27	<0.01	1.95	1.87	10	0.4	<0.02
TL-4C	10/02/01	FGL/OBL	1,090	670	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
TL-4C	06/25/02	FGL/OBL	1,380	870	6.9	180	4.3	67	26	162	5	227	167	220	<0.4	<0.1	<2	-	0.41	<0.01	3.92	2.67	1.6	<0.4	<0.02
TL-10A	09/12/01	FGL/OBL	896	560	7.6	210	3.5	47	22	115	5	99	106	250	<0.4	0.1	<2	-	0.26	<0.01	1.26	1.06	10.6	<0.4	<0.02
TL-10B	09/12/01	FGL/OBL	989	580	7.5	250	3.6	51	25	124	5	101	109	300	<0.4	0.2	3	-	0.25	<0.01	1.94	1.28	10.2	<0.4	<0.02
TL-10C	04/16/93		1,064	647	7.0	-	3.9	57	24	140	4	93	120	349	-	-	-	-	-	-	-	-	-	-	

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
TL-10C	09/12/01	FGL/OBL	904	540	7.4	240	3.6	47	23	119	4	83	102	290	<0.4	0.3	6	-	0.29	<0.01	2.59	1.67	13	<0.4	<0.02
TL-10C	10/01/01	FGL/OBL	882	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
TL-10C	06/25/02	FGL/OBL	727	420	7.2	200	3.5	30	14	92	3	55	79	240	<0.4	0.3	4	-	0.26	<0.01	2.04	0.97	11.5	<0.4	<0.02
TL-11	09/12/01	FGL/OBL	774	450	7.6	210	3.7	35	17	107	3	67	86	260	<0.4	0.2	<2	-	0.28	<0.01	1.63	1.07	13.7	<0.4	<0.02
TL-12	10/02/01	FGL/OBL	769	460	-	170	4.8	30	9	117	2	82	97	210	<0.4	0.1	<2	-	0.28	<0.01	0.29	0.41	7.3	<0.4	<0.02
TL-12	10/17/02	FGL/OBL	864	520	8.0	210	-	26	5	152	1	59	107	260	<0.4	<0.1	<2	0.038	0.24	0.02	0.15	0.20	-	-	<0.02
TL-13	06/26/01	FGL/OBL	752	450	7.1	140	3.5	33	14	95	3	80	97	170	<0.4	0.1	<2	-	0.26	<0.01	3.04	0.78	4	<0.4	<0.02
TL-13	10/02/01	FGL/OBL	860	520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
TL-14	06/26/01	FGL/OBL	820	500	7.0	190	3.9	36	14	109	3	73	100	230	<0.4	0.2	<2	-	0.25	<0.01	1.78	0.91	10	<0.4	<0.02
TL-14	10/02/01	FGL/OBL	1,030	620	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
TL-14	06/26/02	FGL/OBL	1,190	750	7.2	240	6.1	39	15	178	3	138	153	290	<0.4	<0.1	<2	-	0.24	0.06	2.19	0.93	8.5	<0.4	<0.02
TL-15	06/26/01	FGL/OBL	925	550	7.3	210	5.7	30	12	147	2	82	118	250	<0.4	0.2	<2	-	0.28	<0.01	2.04	0.79	10	<0.4	<0.02
TL-15	10/02/01	FGL/OBL	955	560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
TL-16	10/01/01	FGL/OBL	921	550	7.7	200	2.4	62	27	90	5	95	119	240	<0.4	<0.1	<2	-	0.22	0.1	0.49	1.24	6.9	<0.4	<0.02
TL-17	06/27/01	FGL/OBL	689	390	7.0	130	2.6	39	14	74	3	92	73	160	<0.4	0.1	3	-	0.23	<0.01	4.62	1.35	4	<0.4	<0.02
TL-17	06/25/02	FGL/OBL	926	580	6.7	140	3.6	43	16	109	4	147	115	170	<0.4	<0.1	3	-	0.31	0.01	6.43	1.53	1.8	<0.4	<0.02
<b>Silver Creek Packing</b>																									
SC-3B	02/27/02	FGL	847	510	7.3	150	4.4	31	14	117	3	95	111	190	<0.4	<0.1	-	-	0.29	<0.01	3.27	0.66	-	-	0.03
SC-3B	10/17/02	FGL	1,750	1,020	6.9	150	-	68	30	245	2	219	325	180	<0.4	0.1	<2	0.11	0.28	0.02	7.78	1.32	-	-	<0.02
SC-4B	02/21/02	FGL	1,150	660	7.0	160	5.3	41	18	161	3	144	159	190	<0.4	<0.1	-	-	0.37	<0.01	4.68	0.89	-	-	0.02
SC-4B	06/26/02	FGL/OBL	1,420	840	6.7	170	5.0	55	26	178	3	188	245	200	<0.4	0.1	<2	-	0.33	0.02	7.13	1.16	4.7	<0.4	<0.02
<b>Coelho/Gardner/Hanson</b>																									
CGH-1A	06/27/02	FGL/OBL	1,530	1,000	6.9	120	4.0	70	38	167	4	212	287	150	<0.4	<0.1	<2	-	0.29	<0.01	12.20	2.06	1.1	<0.4	<0.02
CGH-1B	10/17/02	FGL	1,940	1,200	7.1	140	-	56	23	316	3	275	342	180	0.6	<0.1	<2	0.09	0.35	<0.01	2.37	0.86	-	-	<0.02
CGH-1C	06/26/01	FGL/OBL	731	460	7.6	140	4.3	29	10	105	1	98	81	170	<0.4	0.1	<2	-	0.26	<0.01	0.61	0.53	10	<0.4	<0.02
CGH-1C	09/10/01	FGL/OBL	944	580	7.0	130	4.3	42	18	133	2	132	141	160	<0.4	0.2	<2	-	0.3	<0.01	4.47	1.11	4.9	<0.4	<0.02
CGH-1C	10/17/02	FGL	1,400	840	7.5	270	-	40	15	236	2	145	175	330	<0.4	<0.1	<2	0.09	0.31	<0.01	1.04	0.75	-	-	<0.02
CGH-2	08/25/99	FGL	1,370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-2	07/13/00	FGL	1,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-2	09/10/01	FGL/OBL	1,900	1,160	7.4	150	8.4	56	28	309	3	270	349	190	<0.4	0.1	<2	-	0.37	<0.01	3.09	0.87	6.1	<0.4	<0.02
CGH-2	06/27/02	FGL/OBL	2,720	1,750	7.3	160	8.9	83	45	406	4	420	560	190	<0.4	<0.1	<2	-	0.41	<0.01	4.51	1.37	5.2	<0.4	<0.02
CGH-2	08/19/02	FGL	2,410	1,490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-2	08/19/02	TL	2,400	1,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-2	08/19/02	CLS	2,400	1,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-2	10/17/02	FGL	2,470	1,510	7.1	290	-	77	42	387	4	320	420	330	<0.4	<0.1	<2	0.064	0.4	<0.01	7.83	1.15	-	-	<0.02
CGH-3	06/26/01	FGL/OBL	2,310	1,430	7.3	110	7.9	74	43	345	3	358	413	140	<0.4	0.1	<2	-	0.39	<0.01	2.64	1.84	10	<0.4	<0.02
CGH-3	09/10/01	FGL/OBL	2,940	1,820	7.4	170	9.5	90	54	462	4	420	610	210	<0.4	0.2	<2	-	0.48	<0.01	2.65	1.75	8.1	<0.4	<0.02
CGH-3	08/20/02	FGL/OBL	3,410	2,150	7.0	180	11.7	85	52	554	3	440	740	220	<0.4	<0.1	<2	-	0.54	<0.01	1.30	1.35	7.7	<0.4	<0.02

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>						Cations				Anions					Trace Elements								
			EC <sup>2</sup> µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
CGH-3	08/20/02	TL	3,400	2,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-3	08/20/02	CLS	3,200	2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-4	07/13/00	FGL	3,190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-4	09/10/01	FGL/OBL	4,250	2,620	7.9	240	23.6	70	23	892	6	460	940	290	<0.4	0.1	<2	-	0.98	<0.01	0.34	0.46	16	<0.4	<0.02
CGH-5	08/03/99	FGL	3,630	2,130	8.0	-	16.4	49	20	540	4	280	860	290	<0.4	-	<2	-	0.7	-	0.20	0.30	-	-	-
CGH-5	07/13/00	FGL	3,290	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-5	10/17/02	FGL	4,870	3,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-6A	06/27/01	FGL/OBL	2,910	1,740	7.4	280	10.8	69	46	471	3	507	464	340	<0.4	0.2	<2	-	0.78	<0.01	2.36	1.24	20	<0.4	<0.02
CGH-6A	08/20/02	FGL/OBL	3,980	2,480	7.4	280	12.3	100	69	654	3	640	800	340	<0.4	0.1	-	-	0.75	<0.01	2.44	1.75	16.2	<0.4	<0.02
CGH-6A	08/20/02	TL	4,000	2,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-6A	08/20/02	CLS	3,800	2,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-6B	10/17/02	FGL	3,390	2,110	7.8	150	-	87	51	567	4	470	640	190	<0.4	0.1	<2	0.12	0.54	<0.01	0.96	0.60	-	-	<0.02
CGH-6C	10/17/02	FGL	2,290	1,400	7.7	380	-	53	30	290	2	210	330	460	<0.4	0.1	<2	0.084	0.46	0.01	0.42	0.78	-	-	<0.02
CGH-6D	10/17/02	FGL	1,990	1,160	7.6	470	-	30	15	381	2	123	276	580	<0.4	0.1	<2	0.096	0.46	0.05	2.33	0.71	-	-	<0.02
CGH-7	07/22/97	WAL	1,000	680	8.1	-	10.7	32	13	283	4	110	511	445	0.71	-	-	-	0.42	-	-	-	-	-	-
CGH-7	09/22/99	FGL	2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-7	07/13/00	FGL	1,710	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-8	07/22/97	WAL	1000	680	8.2	-	20.65	40	4	540	5	154	511	580	0.82	-	-	-	0.48	-	-	-	-	-	-
CGH-8	08/25/99	FGL	3,030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-8	09/22/99	FGL	3,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-9	06/26/01	FGL/OBL	1,320	810	7.9	430	12.2	27	7	276	2	65	130	530	<0.4	0.2	<2	-	0.32	<0.01	0.05	0.18	10	<0.4	<0.02
CGH-9	09/10/01	FGL/OBL	1,720	1,070	7.9	570	15.4	31	9	379	2	78	180	700	<0.4	0.2	<2	-	0.39	<0.01	0.11	0.22	11.1	<0.4	<0.02
CGH-9	06/27/02	FGL/OBL	2,030	1,290	7.6	520	11.1	48	21	367	3	213	230	640	<0.4	0.1	<2	-	0.49	<0.01	0.78	1.09	15.2	<0.4	<0.02
CGH-10	06/26/01	FGL/OBL	1,010	620	7.9	290	8.0	25	10	188	2	75	98	350	<0.4	0.2	<2	-	0.31	<0.01	<0.05	0.27	10	<0.4	<0.02
CGH-10	09/10/01	FGL/OBL	1,320	830	7.9	460	11.2	31	10	280	2	59	123	560	<0.4	0.3	<2	-	0.35	<0.01	<0.05	0.28	13	<0.4	<0.02
CGH-10	08/19/02	FGL/OBL	1,560	1,010	7.6	530	11.1	33	13	298	2	80	147	620	<0.4	0.2	<2	-	0.4	<0.01	0.08	0.37	13	0.4	<0.02
CGH-10	08/19/02	TL	1,600	950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-10	08/19/02	CLS	1,500	910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-11	06/26/01	FGL/OBL	2,680	1,620	7.4	260	11.6	65	35	465	3	361	458	320	<0.4	0.2	<2	-	0.49	<0.01	1.14	1.40	10	<0.4	<0.02
CGH-11	09/10/01	FGL/OBL	2,750	1,720	7.5	230	10.3	81	48	475	4	440	480	280	<0.4	0.2	<2	-	0.57	<0.01	2.17	2.01	13.9	<0.4	<0.02
CGH-11	06/27/02	FGL/OBL	4,000	2,630	7.1	230	11.3	104	78	628	5	780	800	280	<0.4	<0.1	<2	-	0.8	<0.01	4.65	3.19	15.5	<0.4	<0.02
CGH-11	08/19/02	FGL	3,320	2,130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-11	08/19/02	TL	3,300	2,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CGH-11	08/19/02	CLS	3,200	2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Meyers Farming</b>																									
MS-1	03/22/99	BSK	4,100	2,700	-	-	-	-	-	-	-	-	1,100	-	-	-	-	-	0.69	-	-	-	-	-	-
MS-1	03/23/99	TL	-	2,800	-	-	-	-	-	-	-	-	970	-	-	-	-	-	0.62	-	-	-	-	-	-
MS-1	08/25/99	FGL	5,180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-1	09/22/99	FGL	4,750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>						Cations				Anions					Trace Elements									
			EC <sup>2</sup> µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)	
MS-1A	08/28/01	TL	6,100	4,000	-	-	-	-	-	-	-	-	-	-	-	-	0.82	-	-	-	-	10	-	-		
MS-1A	09/10/01	FGL/OBL	6,570	4,410	7.2	240	16.3	159	141	1,170	7	1,230	1,370	290	<0.4	0.3	<2	-	1.12	<0.01	13.70	2.94	15.4	<0.4	<0.02	
MS-2	03/22/99	BSK	3,900	2,500	-	-	-	-	-	-	-	-	890	-	-	-	-	-	-	0.68	-	-	-	-	-	-
MS-2	03/23/99	TL	-	2,600	-	-	-	-	-	-	-	-	790	-	-	-	-	-	-	0.63	-	-	-	-	-	-
MS-2	08/28/01	TL	5,100	3,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.84	-	-	-	20	-	-
MS-2	09/10/01	FGL/OBL	5,000	3,050	7.8	300	17.7	95	76	952	5	720	1,020	370	<0.4	0.1	<2	-	0.69	<0.01	1.08	0.82	21.3	<0.4	<0.02	
MS-3	03/22/99	BSK	2,800	1,900	-	-	-	-	-	-	-	-	620	-	-	-	-	-	-	0.72	-	-	-	-	-	-
MS-3	03/23/99	TL	-	2,000	-	-	-	-	-	-	-	-	530	-	-	-	-	-	-	0.66	-	-	-	-	-	-
MS-3	08/28/01	TL	3,500	2,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.66	-	-	-	2000 <sup>5</sup>	-	-
MS-3	09/10/01	FGL/OBL	3,860	2,290	7.9	260	25.3	48	18	809	4	380	860	320	<0.4	0.4	<2	-	0.65	<0.01	0.27	0.22	25.9	<0.4	<0.02	
MS-4	03/22/99	BSK	2,300	1,600	-	-	-	-	-	-	-	-	440	-	-	-	-	-	-	0.73	-	-	-	-	-	-
MS-4	03/23/99	TL	-	1,700	-	-	-	-	-	-	-	-	390	-	-	-	-	-	-	0.7	-	-	-	-	-	-
MS-4	07/13/00	FGL	2,720	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-4	06/27/01	FGL/OBL	2,830	1,720	7.8	340	13.0	49	36	493	3	495	403	410	<0.4	0.2	<2	-	0.9	<0.01	0.95	0.36	40	<0.4	<0.02	
MS-4	08/28/01	TL	2,700	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.86	-	-	-	40	-	-	
MS-4	09/10/01	FGL/OBL	2,730	1,740	7.7	350	14.0	50	38	539	3	510	350	430	<0.4	0.4	<2	-	1.00	<0.01	1.84	0.39	40.7	<0.4	<0.02	
MS-6	06/27/02	FGL/OBL	2,930	1,900	8.0	370	12.7	54	43	516	3	640	360	460	<0.4	0.2	<2	-	1.10	<0.01	0.67	0.34	41.2	<0.4	<0.02	
MS-6	08/21/02	FGL	3,590	2,210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-6	08/21/02	TL	3,600	2,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-6	08/21/02	CLS	3,500	2,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-7	04/30/02	TL	-	1,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-7	08/19/02	FGL/OBL	2,930	1,890	7.3	370	14.0	49	38	538	2	460	430	450	<0.4	0.2	<2	-	0.98	<0.01	0.53	0.38	38.7	<0.4	<0.02	
MS-7	08/19/02	TL	-	-	-	-	15.2	49	37	580	6	470	400	440	-	-	-	-	-	-	-	-	-	-	-	
MS-7	08/19/02	CLS	2,900	1,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
P-1	08/03/98	BSK	4,000	2,500	-	-	-	-	-	-	-	-	790	-	-	-	-	-	-	0.89	-	-	-	-	-	-
P-1	01/04/99	BSK	3,500	2,400	-	-	-	-	-	-	-	-	690	-	-	-	-	-	-	1.0	-	-	-	-	-	-
P-1	04/01/99	BSK	3,800	2,500	-	-	-	-	-	-	-	-	830	-	-	-	-	-	-	0.88	-	-	-	-	-	-
P-1	08/05/99	FGL/OBL	4,620	2,920	7.6	-	15.0	82	85	810	5	760	870	360	<0.4	-	3	-	0.9	-	0.12	0.70	-	-	-	-
P-1	06/28/01	FGL	4,810	3,380	7.7	290	13.7	98	96	796	4	857	920	360	<0.4	0.1	2	-	0.89	<0.01	0.35	0.68	50	<0.4	<0.02	
P-2	08/03/98	BSK	6,000	4,000	-	-	-	-	-	-	-	-	1,300	-	-	-	-	-	-	0.84	-	-	-	-	-	-
P-2	01/04/99	BSK	6,000	4,300	-	-	-	-	-	-	-	-	1,500	-	-	-	-	-	-	0.8	-	-	-	-	-	-
P-2	04/01/99	BSK	5,800	4,100	-	-	-	-	-	-	-	-	1,400	-	-	-	-	-	-	0.89	-	-	-	-	-	-
P-3	08/03/98	BSK	5,500	3,500	-	-	-	-	-	-	-	-	1,100	-	-	-	-	-	-	1.2	-	-	-	-	-	-
P-3	01/04/99	BSK	5,000	3,600	-	-	-	-	-	-	-	-	1,100	-	-	-	-	-	-	1.2	-	-	-	-	-	-
P-3	04/01/99	BSK	5,300	3,600	-	-	-	-	-	-	-	-	1,200	-	-	-	-	-	-	1.1	-	-	-	-	-	-
P-4	08/03/98	BSK	9,000	5,800	-	-	-	-	-	-	-	-	2,300	-	-	-	-	-	-	1.5	-	-	-	-	-	-
P-4	01/04/99	BSK	8,200	5,900	-	-	-	-	-	-	-	-	2,100	-	-	-	-	-	-	1.3	-	-	-	-	-	-
P-4	04/01/99	BSK	8,900	6,200	-	-	-	-	-	-	-	-	2,600	-	-	-	-	-	-	1.2	-	-	-	-	-	-
P-5	08/03/98	BSK	6,200	4,000	-	-	-	-	-	-	-	-	1,200	-	-	-	-	-	-	1.1	-	-	-	-	-	-

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>						Cations				Anions					Trace Elements								
			EC <sup>2</sup> µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
P-5	01/04/99	BSK	5,300	4,000	-	-	-	-	-	-	-	1,100	-	-	-	-	-	1.3	-	-	-	-	-	-	
P-5	04/01/99	BSK	6,000	4,200	-	-	-	-	-	-	-	1,300	-	-	-	-	-	1.0	-	-	-	-	-	-	
P-6	08/03/98	BSK	37,000	32,000 <sup>5</sup>	-	-	-	-	-	-	-	8,800	-	-	-	-	-	6.5	-	-	-	-	-	-	
P-6	01/04/99	BSK	31,000	31,000 <sup>5</sup>	-	-	-	-	-	-	-	7,600	-	-	-	-	-	8	-	-	-	-	-	-	
P-6	04/01/99	BSK	35,000	32,000 <sup>5</sup>	-	-	-	-	-	-	-	8,600	-	-	-	-	-	8.3	-	-	-	-	-	-	
S-1	08/03/98	BSK	6,100	4,300	-	-	-	-	-	-	-	1,400	-	-	-	-	-	1.2	-	-	-	-	-	-	
S-1	01/04/99	BSK	7,200	5,600	-	-	-	-	-	-	-	1,900	-	-	-	-	-	1.3	-	-	-	-	-	-	
S-1	04/01/99	BSK	7,200	5,200	-	-	-	-	-	-	-	2,000	-	-	-	-	-	1.1	-	-	-	-	-	-	
S-1	08/05/99	FGL	7,470	5,100	6.7	-	17.3	150	168	1,300	11	1,380	1,610	230	<0.4	-	<2	-	1.4	-	3.40	2.20	-	-	-
S-2	08/03/98	BSK	6,500	4,900	-	-	-	-	-	-	-	960	-	-	-	-	-	3.4	-	-	-	-	-	-	
S-2	01/04/99	BSK	5,900	4,600	-	-	-	-	-	-	-	1,000	-	-	-	-	-	3.4	-	-	-	-	-	-	
S-2	04/01/99	BSK	6,300	4,600	-	-	-	-	-	-	-	1,200	-	-	-	-	-	2.4	-	-	-	-	-	-	
S-2	08/05/99	FGL	7,410	5,560	6.9	-	19.8	160	142	1,430	16	2,460	890	360	<0.4	-	<2	-	7.7	-	0.20	1.60	-	-	-
S-3	08/03/98	BSK	4,400	3,100	-	-	-	-	-	-	-	910	-	-	-	-	-	0.97	-	-	-	-	-	-	
S-3	01/04/99	BSK	4,500	3,000	-	-	-	-	-	-	-	1,000	-	-	-	-	-	1.0	-	-	-	-	-	-	
S-3	04/01/99	BSK	4,200	2,800	-	-	-	-	-	-	-	960	-	-	-	-	-	0.75	-	-	-	-	-	-	
S-3	08/05/99	FGL	5,300	3,280	7.0	-	15.8	98	93	910	6	740	1,090	350	<0.4	-	2	-	0.9	-	1.40	1.50	-	-	-
S-3	09/29/99	FGL	5,610	3,540	6.9	-	15.1	108	99	900	7	770	1,180	380	1.0	-	<2	-	1.0	-	3.30	1.60	-	-	-
S-3	06/27/01	FGL/OBL	7,430	4,830	7.2	310	16.9	165	145	1,230	8	1,480	1,420	370	<0.8	<0.2	<2	-	1.27	<0.01	1.77	1.26	50	1.1	<0.02
S-3	06/24/02	FGL/OBL	8,220	6,000	7.4	360	17.0	204	181	1,380	8	2,040	1,500	440	<0.4	<0.1	3	-	3.06	<0.01	2.30	1.16	58.4	0.66	<0.02
MF-1	03/26/02	FGL	2,170	1,370	7.0	490	6.4	82	50	296	8	270	220	600	3.2	<0.1	<10	0.134	0.2	<0.01	3.66	1.36	-	-	<0.02
MF-1	04/23/02	TL	1,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-1	09/17/02	TL	2,100	1,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-2	03/26/02	FGL	2,450	1,500	7.1	670	8.0	93	37	361	7	153	310	810	<0.4	<0.1	<10	0.243	0.29	<0.01	0.16	1.00	-	-	<0.02
MF-2	04/23/02	TL	2,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-2	09/17/02	TL	2,300	1,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-3	03/26/02	FGL	1,810	1,100	7.1	620	5.8	60	51	253	5	103	160	760	<0.4	0.1	<10	0.059	0.23	<0.01	0.65	2.01	-	-	<0.02
MF-3	04/23/02	TL	1,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-3	09/17/02	TL	2,100	1,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-4	03/27/02	FGL	2,810	1,580	6.9	1,130	6.3	160	41	343	40	2	270	1,380	<0.4	0.2	40	0.511	0.28	<0.01	11.50	2.37	-	-	<0.02
MF-4	04/23/02	TL	2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-4	09/17/02	TL	2,900	1,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-5	03/27/02	FGL	2,750	1,710	6.9	720	7.7	109	55	395	10	270	240	870	<0.4	0.4	<10	0.216	0.37	<0.01	5.85	1.47	-	-	<0.02
MF-5	04/23/02	TL	1,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MF-5	10/10/02	TL	3,000	1,800	7.0	770	-	120	56	460	19	300	330	940	<2	-	<10	0.28	0.37	<0.05	8.6	1.4	-	-	<0.05
MF-6	10/11/02	TL	1,200	640	7.1	300	-	30	14	200	9	87	130	360	-	-	<10	0.14	0.32	<0.05	0.4	0.4	-	-	<0.05
MF-7	10/11/02	TL	4,100	2,600	7.3	1000	-	75	69	760	18	470	410	1,200	-	-	<10	0.88	0.20	<0.05	1.6	0.7	-	-	<0.05
MF-8	10/10/02	TL	4,900	3,100	7.5	1300	-	30	22	970	19	370	630	1,500	2.5	-	<10	0.14	1.00	<0.05	<0.1	0.5	-	-	<0.05

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>						Cations			Anions					Trace Elements									
			EC <sup>2</sup> µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
MF-9	10/10/02	TL	2,300	1,500	7.4	500	-	47	23	440	12	330	240	610	<2	-	<10	0.11	0.59	<0.05	0.21	0.68	-	-	<0.05
<b>Five Star</b>																									
FS-1	10/19/93	NA	1,520	907	7.3	-	7.4	36	26	240	2	200	240	241	-	-	-	-	-	-	-	-	-	-	
FS-1	09/12/01	FGL/OBL	1,030	590	8.0	200	6.6	29	15	176	2	102	139	240	<0.4	0.2	<2	-	0.36	<0.01	0.30	0.40	18	<0.4	<0.02
FS-1	08/21/02	FGL	1,160	710	7.9	220	7.1	29	15	190	2	110	166	260	<0.4	0.1	<2	-	0.36	<0.01	0.24	0.39	-	-	<0.02
FS-1	08/21/02	TL	1,200	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FS-1	08/21/02	CLS	1,200	670	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FS-2	10/03/01	FGL/OBL	1,190	740	7.4	180	4.4	51	27	157	3	202	134	210	<0.4	0.1	<2	-	0.36	<0.01	1.24	1.17	13.9	<0.4	<0.02
FS-3	09/12/01	FGL/OBL	1,680	1,020	8.0	400	11.9	30	17	330	3	181	194	490	<0.4	0.2	<2	-	0.5	<0.01	1.13	0.68	24	<0.4	<0.02
FS-3	10/02/01	FGL/OBL	1,930	1,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	
FS-4	10/02/01	FGL/OBL	1,740	1,060	7.8	420	13.8	24	14	345	2	175	211	520	<0.4	0.2	<2	-	0.5	<0.01	0.66	0.50	24	<0.4	<0.02
FS-5	08/04/99	FGL	765	470	7.4	-	4.3	24	13	105	3	98	93	190	<0.4	-	<2	-	0.3	-	0.60	0.40	-	-	-
FS-5	09/27/99	FGL	698	440	7.4	-	4.1	24	13	101	2	63	94	190	<0.4	-	<2	-	0.3	-	0.60	0.30	-	-	-
FS-5	10/03/01	FGL/OBL	1,040	640	7.6	170	5.9	31	16	161	3	117	151	200	<0.4	0.3	<2	-	0.37	<0.01	0.88	0.30	11.2	<0.4	<0.02
FS-5	06/25/02	FGL/OBL	921	540	7.6	150	5.1	27	14	131	2	90	143	190	<0.4	0.1	<2	-	0.31	<0.01	0.55	0.32	7.9	<0.4	<0.02
FS-5	08/21/02	FGL	1,200	740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FS-5	08/21/02	TL	1,200	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FS-5	08/21/02	CLS	1,200	710	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FS-6	09/12/01	FGL/OBL	2,340	1,390	7.9	260	9.6	63	39	392	3	330	401	320	<0.4	0.2	<2	-	0.52	<0.01	0.42	0.60	23.2	<0.4	<0.02
FS-7	10/03/01	FGL/OBL	2,500	1,600	7.3	280	7.9	83	57	380	3	489	374	340	<0.4	0.1	<2	-	0.53	<0.01	1.85	1.35	17.7	<0.4	<0.02
FS-8	10/03/01	FGL/OBL	2,240	1,310	7.7	240	12.1	43	24	400	3	210	444	290	<0.4	0.2	<2	-	0.6	<0.01	0.63	0.38	19	<0.4	<0.02
FS-9	09/12/01	FGL/OBL	2,090	1,290	7.9	310	9.8	44	38	368	3	343	286	380	<0.4	0.2	<2	-	0.56	<0.01	1.14	1.14	17.6	<0.4	<0.02
FS-10	10/19/93	NA	1,440	874	8.0	-	13.4	16	9	270	2	130	190	333	-	-	-	-	-	-	-	-	-	-	
FS-10	06/26/01	FGL/OBL	1,280	770	7.6	300	9.1	25	16	237	2	154	125	370	<0.4	0.3	<2	-	0.42	0.03	0.50	0.64	10	<0.4	<0.02
FS-10	10/03/01	FGL/OBL	1,400	910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
FS-10	06/25/02	FGL/OBL	1,630	1,060	7.4	290	6.1	54	35	236	3	295	158	350	<0.4	0.1	<2	-	0.39	<0.01	0.85	2.32	11.4	<0.4	<0.02
<b>Coelho West</b>																									
CW-1	10/20/93	NA	1,175	697	7.4	-	9.5	21	12	220	3	110	160	239	-	-	-	-	-	-	-	-	-	-	
CW-1	09/12/01	FGL/OBL	1,280	780	8.2	210	12.1	18	9	251	2	218	133	260	<0.4	0.1	<2	-	0.44	<0.01	0.53	0.19	13.5	<0.4	<0.02
CW-1	06/17/02	TL	1,100	660	7.4	190	11.9	18	9	250	4	160	120	230	<2.0	-	-	0.048	0.44	<0.05	0.94	0.24	-	-	<0.05
CW-1	08/21/02	FGL/OBL	1,060	680	8.1	200	11.1	14	7	203	1	131	134	240	<0.4	<0.1	-	-	0.4	<0.01	0.41	0.18	13.7	<0.4	<0.02
CW-1	08/21/02	TL	1,100	640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CW-1	08/21/02	CLS	1,000	630	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CW-2	09/12/01	FGL/OBL	1,780	1,100	8.3	440	17.9	18	11	391	2	183	202	500	<0.4	0.2	<2	-	0.61	<0.01	1.24	0.20	30.5	<0.4	<0.02
CW-2	06/25/02	FGL/OBL	1,100	670	8.5	250	13.4	9	6	212	1	108	133	300	<0.4	0.1	<2	-	0.46	<0.01	1.10	0.06	19.7	<0.4	<0.02
CW-2	08/21/02	FGL	1,160	710	8.5	250	14.0	10	7	236	<1	120	133	290	<0.4	0.2	-	0.0245	0.43	<0.01	0.09	0.05	-	-	<0.02
CW-2	08/21/02	TL	1,200	690	-	-	14.8	10	7	250	2	110	140	300	-	-	-	-	-	-	-	-	-	-	
CW-2	08/21/02	CLS	1,200	660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CW-3	08/24/00	FGL	1,570	920	8.1	300	18.2	13	8	338	1	204	156	340	<0.4	0.2	-	0.041	0.5	<0.01	0.73	0.12	-	-	<0.02

**Table C-1**  
**Summary of Ground-Water Quality Laboratory Results (Shallow Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (μg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
CW-3	06/25/01	FGL/OBL	1,710	1,050	8.0	330	16.8	16	10	348	2	232	188	400	<0.4	0.3	<2	-	0.51	<0.01	0.80	0.20	30	<0.4	<0.02
CW-3	06/17/02	TL	1,500	920	7.6	300	16.0	16	11	340	3	180	190	370	<2.0	-	-	0.045	0.56	<0.05	1.40	0.26	-	-	<0.05
CW-3	08/21/02	FGL/OBL	1,650	1,020	8.1	350	16.9	15	9	336	1	208	187	390	<0.4	0.3	-	-	0.56	<0.01	0.35	0.15	28.4	<0.4	0.02
CW-3	08/21/02	TL	1,700	999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CW-3	08/21/02	CLS	1,600	940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CW-4	04/09/93	NA	1,850	1,050	7.3	-	11.8	29	14	310	3	140	190	497	-	-	-	-	-	-	-	-	-	-	-
CW-4	09/12/01	FGL/OBL	2,780	1,730	8.3	790	29.0	20	11	650	2	216	319	910	<0.4	0.4	<2	-	0.85	<0.01	1.11	0.21	59.5	<0.4	<0.02
CW-4	06/17/02	TL	1,600	940	7.2	250	12.6	24	15	320	5	250	160	310	<2.0	-	-	0.072	0.51	<0.05	0.81	0.65	-	-	<0.05
CW-4	08/21/02	FGL/OBL	1,600	1,000	7.5	330	11.3	25	16	295	2	190	174	400	<0.4	0.4	-	-	0.5	<0.01	1.95	0.61	18.2	0.9	<0.02
CW-4	08/21/02	TL	1,600	960	-	-	12.2	26	16	320	5	210	170	400	-	-	-	-	-	-	-	-	-	-	
CW-4	08/21/02	CLS	1,500	970	-	330	10.7	26	16	280	3	220	180	403	-	-	-	-	-	-	-	-	-	-	
CW-5	06/28/01	FGL/OBL	2,340	1,450	8.2	630	20.4	21	12	474	2	176	267	750	<0.4	0.3	<2	-	0.7	<0.01	0.35	0.23	60	<0.4	<0.02
CW-5	10/03/01	FGL/OBL	2,630	1,620	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
CW-5	06/17/02	TL	1,900	1,100	7.9	440	20.5	17	10	430	4	180	210	540	<2.0	-	-	0.061	0.64	<0.05	0.48	0.23	-	-	<0.05
CW-5	08/20/02	FGL/OBL	2,640	1,590	8.0	760	26.9	18	10	574	2	217	290	860	<0.4	0.4	-	-	0.81	<0.01	0.38	0.23	44.2	<0.4	<0.02
CW-5	08/21/02	TL	2,700	1,600	-	-	29.0	17	10	610	4	190	310	930	-	-	-	-	-	-	-	-	-	-	
CW-5	08/21/02	CLS	2,600	1,600	-	780	25.3	19	11	560	2	200	290	952	-	-	-	-	-	-	-	-	-	-	

1. Laboratory Abbreviations: USGS - U.S. Geological Survey; FGL - Fruit Growers Laboratory, Santa Paula; BSK - BSK Analytical Laboratories, Fresno; TL - The Twining Laboratories, Inc.;

BCL - BC Laboratories, Bakersfield; CLS - California Laboratory Services, Rancho Cordova; OBL-Selenium and Molybdenum Analyses by Olson Biochemistry Laboratories of South Dakota State University, Brookings, SD indicated by italics.

2. Electrical Conductivity at 25°C

3. HCO<sub>3</sub>, total alkalinity and NO<sub>3</sub> reported as HCO<sub>3</sub>, CaCO<sub>3</sub> and NO<sub>3</sub>, respectively.

4. Only selenium results analysed with a detection limit ≤0.5 μg/L are reported.

5. Laboratory analysis appears to be erroneous.

NA = Not Available

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements													
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)	
<b>CCID</b>																										
5A	08/04/99	FGL	688	450	7.9	-	6.0	16	5	107	2	97	85	150	<0.4	-	2	-	0.3	-	0.05	0.03	-	-	-	
5A	09/29/99	FGL	587	350	7.7	-	4.0	23	8	88	2	70	79	140	<0.4	-	<2	-	0.2	-	0.6	0.3	-	-	-	
5A	06/07/01	BSK	730	460	7.9	110	7.5	18	5.3	140	2	110	92	134	<10	-	-	-	0.2	-	-	-	-	-	-	
5A	09/30/02	BSK	910	590	7.7	120	-	19	5	180	2	150	98	120	ND	-	-	-	0.4	-	-	-	-	-	-	
12C	06/07/01	CCID	1,700	1,200	7.3	120	5.7	86	42	260	4	420	260	146	ND	-	-	-	0.5	-	-	-	-	-	-	
12C	09/30/02	BSK	1,900	1,300	6.8	130	-	82	41	270	6	430	250	130	ND	-	-	-	0.6	-	-	-	-	-	-	
15B	06/21/01	CCID	1,100	730	7.3	98	4.0	59	29	150	4	230	160	120	ND	-	-	-	0.3	-	-	-	-	-	-	
15B	09/30/02	BSK	1,200	770	6.8	120	-	56	29	160	4	240	160	120	ND	-	-	-	0.4	-	-	-	-	-	-	
16B	10/20/93	NA	839	523	6.8	-	3.1	38	23	99	3.6	120	120	-	-	-	-	-	-	-	-	-	-	-	-	
16B	09/30/02	BSK	1,000	620	6.7	110	-	51	27	130	4.0	180	130	110	ND	-	-	-	0.3	-	-	-	-	-	-	
23B	06/07/01	CCID	2,600	1,100	7.5	120	7.4	120	62	400	6	670	380	146	ND	-	-	-	1.2	-	-	-	-	-	-	
23B	09/30/02	BSK	2,700	1,900	6.5	140	-	110	61	400	6	700	360	140	ND	-	-	-	1.2	-	-	-	-	-	-	
28B	08/04/99	FGL	1,400	940	6.9	-	3.9	70	32	157	5	310	153	200	<0.4	-	3	-	0.4	-	11.4	1.5	-	-	-	
28B	09/29/99	FGL	1,410	960	6.7	-	3.6	76	36	152	6	326	162	210	<0.4	-	<2	-	0.4	-	0.05	0.01	-	-	-	
32B	08/04/99	FGL	2,120	1,480	7.1	-	4.9	120	40	242	6	630	204	210	<0.4	-	<2	-	1.3	-	0.8	2.8	-	-	-	
32B	09/29/99	FGL	1,450	1,010	7.2	-	3.6	88	33	156	5	362	152	210	<0.4	-	<2	-	0.7	-	0.9	3.0	-	-	-	
32B	08/23/00	FGL	2,270	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
32B	06/07/01	BSK	2,100	1,600	7.8	160	5.5	130	47	290	5	720	240	195	28	-	-	-	1.4	-	-	-	-	-	-	
32B	09/30/02	BSK	2,100	1,500	7.3	160	-	130	48	300	6.0	630	210	160	ND	-	-	1.3	-	-	-	-	-	-	-	
35A	06/07/01	CCID	1,200	830	7.6	110	4.2	62	30	160	5	280	150	134	ND	-	-	-	0.3	-	-	-	-	-	-	
35A	09/30/02	BSK	1,400	900	6.8	130	-	71	33	190	5	310	160	130	ND	-	-	-	0.3	-	-	-	-	-	-	
38A	06/15/01	CCID	620	340	7.9	110	14.9	3	1	120	ND	58	76	134	ND	-	-	-	0.1	-	-	-	-	-	-	
<b>Locke Ranch</b>																										
No. 8	08/04/99	FGL	1,210	800	8.1	-	10.1	25	3	200	2	276	110	170	<0.4	-	<2	-	0.5	-	0.11	0.17	-	-	-	
No. 8	09/29/99	FGL	633	420	8.3	-	10.4	6	2	115	<1	85	72	140	<0.4	-	<2	-	0.2	-	0.1	0.1	-	-	-	
<b>Columbia Canal Co.</b>																										
Elrod-1	05/14/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
Elrod-1	07/31/02	JML	1,700	1,088	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Elrod-2	02/24/99	JML	400	-	7.8	-	20.7	2	0.30	109	-	27	43	-	10.6	-	-	-	0.3	-	-	-	-	-	-	-
Elrod-2	05/14/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	
Elrod-2	07/31/02	JML	510	326	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Davis	02/24/99	JML	840	-	7.6	-	9.6	18	8	193	-	102	112	-	9.7	-	-	-	0.5	-	-	-	-	-	-	-
Davis	08/01/02	JML	890	570	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cardella-1 <sup>o</sup>	09/29/97	JML	800	-	7.9	-	21.4	-	-	175	-	-	71	220	7.1	-	-	0.1	-	-	-	-	-	-	-	
Cardella-1	05/04/01	JML	750	480	7.7	-	7.3	21	4.3	140	-	77	100	-	0.0	-	-	0.1	-	-	-	-	-	-	-	
Cardella-1	08/01/02	JML	840	538	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lopes-1 <sup>o</sup>	03/18/99	JML	490	-	8.2	-	40.5	1	ND	132	-	56	50	-	2.2	-	-	0.3	-	-	-	-	-	-	-	
Lopes-1	05/04/01	JML	510	326	8.1	-	5.7	16	2.6	93	-	60	65	-	0.0	-	-	0.3	-	-	-	-	-	-	-	
Lopes-1	05/14/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
Lopes-1	08/01/02	JML	890	570	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Snyder	05/04/01	JML	950	608	7.9	-	9.0	20	3	164	-	123	147	-	4.4	-	-	0.5	-	-	-	-	-	-	-	
Snyder	07/31/02	JML	660	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CC-1	11/08/94	JML	270	-	8.8	-	-	-	-	62	-	-	18	-	3.5	-	-	0.2	-	-	-	-	-	-	-	

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations				Anions				Trace Elements														
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
CC-1	09/29/97	JML	300	-	8.2	-	11.7	-	-	67	-	-	14	116	1.8	-	-	0.1	-	-	-	-	-	-	
CC-1	06/04/99	JML	860	-	8.6	-	12.9	2	ND	73	-	27	16	-	6.2	-	-	-	0.1	-	-	-	-	-	
CC-1	05/04/01	JML	270	173	8.6	-	3.4	17	2	54	-	27	14	-	0.0	-	-	0.0	-	-	-	-	-	-	
CC-1	08/06/02	JML	250	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CC-2	11/08/94	JML	320	-	8.8	-	-	-	-	67	-	-	32	-	3.5	-	-	0.2	-	-	-	-	-	-	
CC-2	09/29/97	JML	400	-	8.3	-	32.3	-	-	92	-	-	21	140	1.8	-	-	0.1	-	-	-	-	-	-	
CC-2	05/04/01	JML	350	224	8.6	-	4.3	16	2	69	-	55	27	-	0.0	-	-	0.1	-	-	-	-	-	-	
CC-2	05/14/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-		
CC-2	08/06/02	JML	330	211	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Burkhart	07/31/02	JML	510	326	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Garcia-1	08/06/02	JML	780	499	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Garcia-2	08/01/02	JML	1,430	915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Garcia-3	08/01/02	JML	1,000	640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Garcia-4	08/06/02	JML	750	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Garcia-5	08/01/02	JML	960	614	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DMA	02/24/99	JML	360	-	7.0	-	3.6	17	3.8	63	0	32	47	-	13.3	-	-	0.1	-	-	-	-	-	-	
DMA	06/04/99	JML	1,740	-	7.2	-	9.4	72	14	333	-	182	362	-	0	-	-	0.4	-	-	-	-	-	-	-
DMA	08/01/02	JML	2,490	1,594	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mowry Die.	05/17/01	JML	630	-	8.1	-	29.8	2	ND	160	-	84	97	-	0.0	-	-	0.5	-	-	-	-	-	-	
Mowry Die.	08/02/02	JML	700	448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mowry Riv.	06/24/99	JML	720	-	7.9	-	5.5	26	5	115	-	70	81	-	2.66	-	-	0.2	-	-	-	-	-	-	
Mowry Riv.	05/17/01	JML	480	-	7.8	-	4.3	27	2.9	88	-	52	77	-	0.0	-	-	0.1	-	-	-	-	-	-	
<b>USGS</b>		USGS																							
31J5	11/20/85		4,040	2,450	7.9	-	29.4	49	6	820	5	420	990	248	<0.1	-	1	-	0.9	-	0.22	0.34	-	-	
31J5	11/06/91		5,200	2,780	7.7	-	20.4	130	19	940	9	520	990	-	<0.1	-	1	-	0.7	-	0.91	0.46	-	-	
31J5	08/02/99		9,410	6,550	7.4	-	15.3	380	140	1370	16	1,580	2,440	290	<0.4	-	<2	-	2.3	-	1.66	3.69	-	-	
31J5	09/28/99		10,100	6,700	7.4	-	16.2	425	178	1580	19	1,660	2,400	320	<0.4	-	<2	-	3.1	-	2.34	4.0	-	-	
31J5	08/25/00		10,300	7,000	7.3	230	17.8	395	174	1690	17	1,630	2,360	280	<0.8	<0.2	-	-	2.8	<0.01	2.18	3.28	-	<0.02	
31J5	06/27/01		9,750	6,400	6.9	230	16.9	356	168	1540	34	1,430	2,190	280	<0.8	0.8	3	-	3.1	<0.01	10.9	3.61	103	<0.4	
31J5	06/26/02		10,100	7,100	7.2	240	21.6	326	177	1950	18	1,920	2,720	290	<0.4	<0.1	<2	-	3.2	<0.01	1.8	3.12	18.2	<0.02	
10A4	09/28/99	FGL	2,820	2,370	7.5	130	2.5	221	167	200	3	1,370	129	160	5.5	-	2	-	2.1	-	<0.25	0.16	-	-	
<b>AES Mendota</b>		FGL																							
Mend/Biomass	05/17/91		990	625	8.6	180	-	-	-	209	1	83	133	-	-	0.12	-	-	0.2	-	0.058	0.068	-	-	
Mend/Biomass	08/12/94		1050	-	8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mend/Biomass	09/19/96		1200	-	8.4	225	-	-	-	258	-	119	172	-	-	-	-	<0.05	<0.05	-	-	-	<0.05	-	
Mend/Biomass	09/09/99		1290	-	8.5	236	-	-	-	269	-	127	173	-	-	-	-	<0.05	0.35	-	-	-	-	-	
Mend/Biomass	05/11/00		1340	-	8.4	223	-	-	-	272	-	144	208	-	-	-	-	<0.05	0.10	-	-	-	-	-	
Mend/Biomass	11/02/00		1290	-	8.4	233	-	-	-	276	-	128	199	-	-	-	-	<0.05	0.17	-	-	-	-	-	
Mend/Biomass	08/23/01		1330	-	8.3	241	-	-	-	287	-	143	196	-	-	-	-	<0.05	0.09	-	-	-	-	-	
Mend/Biomass	04/18/02		1460	-	8.4	242	-	-	-	296	-	144	218	-	-	-	-	<0.05	0.06	-	-	-	<0.01	-	
Mend/Biomass	06/13/02		1430	-	8.4	237	-	-	-	307	-	160	216	-	-	-	-	<0.05	0.21	-	-	-	-	-	
<b>Hansen Farms</b>		FGL																							
7C1	08/03/99		8,860	5,700	7.8	-	18.2	216	140	1400	8	1,020	2,380	320	7	-	10	-	3.9	-	0.32	0.28	-	-	
7C1	09/28/99		9,510	6,130	7.6	-	18.1	250	173	1520	10	1,270	2,370	310	21	-	4	-	5.2	-	<0.05	0.38	-	-	
7C1	06/27/01	FGL/OBL	9,480	5,950	7.8	240	20.9	226	163	1690	8	1,330	2,330	290	20.6	<0.1	5	-	4.98	<0.01	0.31	0.36	37	50.4	0.13

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations				Anions				Trace Elements														
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
7C1	10/03/01	FGL/OBL	9,430	6,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65.6	-		
<b>Fordel, Inc.</b>																									
M-1	08/03/99	FGL	923	580	8.5	-	20.9	4	0.5	167	2	97	134	180	<0.4	-	<2	-	0.5	-	<0.05	<0.03	-	-	
M-1	09/27/99	FGL	1,040	620	8.2	-	22.8	5	0.5	200	2	118	148	190	<0.4	-	<2	-	0.5	-	<0.05	0.04	-	-	
M-1	08/23/00	FGL	1,020	610	7.8	150	22.1	6	0.5	210	2	106	137	180	<0.4	0.4	-	-	0.5	<0.01	<0.05	0.04	-	<0.02	
M-1	06/28/01	FGL/OBL	1,240	760	8.3	160	22.2	9	0.5	253	3	155	176	190	<0.4	0.5	<2	-	0.6	<0.01	<0.05	0.07	9	<0.4	<0.02
M-1	10/01/01	FGL/OBL	1,200	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
Biomass	07/13/00	FGL	1,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Terra Linda Farms</b>																									
TL-1	07/13/00	FGL	877	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-1	06/25/02	FGL/OBL	1,450	880	8.1	210	19.4	14	1	278	3	157	220	260	<0.4	0.2	<2	-	0.4	<0.01	<0.05	0.08	3.5	<0.4	<0.02
TL-2	07/13/00	FGL	1,440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-3	08/25/99	FGL	651	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-3	09/22/99	FGL	664	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-3	07/13/00	FGL	675	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-3	10/01/01	FGL/OBL	733	450	8.4	140	15.6	5	<1	146	2	65	104	170	<0.4	0.5	<2	-	0.4	<0.01	0.12	0.05	5.5	<0.4	<0.02
TL-5	08/03/99	FGL	1,430	880	8.5	-	24.0	8	0.5	259	3	135	251	210	<0.4	-	<2	-	0.6	-	<0.05	<0.03	-	-	
TL-5	08/25/99	FGL	1,410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-5	09/22/99	FGL	1,376	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-5	09/27/99	FGL	1,370	810	8.4	-	26.6	7	0.5	270	3	126	238	230	<0.4	-	<2	-	0.6	-	<0.05	0.02	-	-	
TL-5	07/13/00	FGL	1,450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-5	06/26/01	FGL/OBL	1,530	900	8.3	190	29.4	8	0.5	317	4	141	261	230	<0.4	0.4	<2	-	0.6	<0.01	<0.05	0.02	9	<0.4	<0.02
TL-6	09/22/99	FGL	4,040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-7	08/25/99	FGL	962	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-7	09/22/99	FGL	1,003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-7	07/13/00	FGL	1,040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-7	06/26/01	FGL/OBL	1,140	700	8.5	170	26.1	5	<1	244	3	105	183	200	<0.4	0.6	<2	-	0.5	<0.01	<0.05	0.02	8	<0.4	<0.02
TL-7	09/12/01	FGL/OBL	1,140	680	8.6	170	27.1	5	<1	254	3	105	185	200	<0.4	0.8	<2	-	0.5	<0.01	<0.05	0.02	9.4	<0.4	<0.02
TL-7	06/26/02	FGL/OBL	1,250	760	8.4	170	24.2	6	<1	243	3	108	217	210	<0.4	0.4	<2	-	0.5	<0.01	<0.05	0.02	7.3	<0.4	<0.02
TL-8	08/25/99	FGL	971	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-8	09/22/99	FGL	1,035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-8	07/13/00	FGL	1,060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-8	06/26/01	FGL/OBL	1,070	650	8.4	160	24.4	5	<1	228	3	113	162	200	<0.4	0.6	<2	-	0.5	<0.01	<0.05	0.02	8	<0.4	<0.02
TL-8	09/12/01	FGL/OBL	1,190	730	8.5	170	24.7	6	<1	248	3	140	183	210	<0.4	0.7	<2	-	0.6	<0.01	<0.05	0.02	10.7	<0.4	<0.02
TL-8	10/02/01	FGL/OBL	1,110	690	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4		
TL-8	06/25/02	FGL/OBL	1,250	780	8.3	170	24.4	6	<1	245	3	134	196	210	<0.4	0.3	<2	-	0.5	<0.01	<0.05	0.03	7.7	<0.4	<0.02
TL-9	08/25/99	FGL	1,290	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TL-9	09/22/99	FGL	1,387	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>Coelho/Coelho</b>																									
Conejo West	08/03/99	FGL	1,460	880	8.3	-	23.3	8	<1	263	4	132	268	200	<0.4	-	<2	-	0.6	-	<0.05	<0.03	-	-	
Conejo West	08/25/99	FGL	1,440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Conejo West	09/28/99	FGL	1,470	870	8.3	-	24.8	8	<1	280	4	136	270	230	<0.4	-	<2	-	0.7	-	<0.05	0.03	-	-	
Conejo West	07/13/00	FGL	1,550	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>Coelho/Coeelho/Fordel</b>																									
CCF-1	07/13/00	FGL	1,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
CCF-1	06/26/01	FGL/OBL	1,710	1,030	8.2	180	25.5	13	1	355	4	197	285	220	<0.4	0.4	<2	-	0.6	<0.01	<0.05	0.05	8	<0.4	<0.02
CCF-1	09/20/01	FGL/OBL	1,720	1,040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations				Anions				Trace Elements													
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)
CCF-1	10/02/01	FGL/OBI	1,740	1,040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-		
<b>Silver Creek Packing</b>																								
SC-5	08/06/99	FGL	3,010	1,730	8.0	-	24.6	38	9	650	10	330	630	240	<0.4	-	<2	-	0.6	-	<0.05	0.1	-	-
SC-5	08/25/99	FGL	3,180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SC-5	09/22/99	FGL	3,210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SC-5	09/27/99	FGL	3,380	1,940	8.0	-	23.7	42	4	600	8	260	770	270	<0.4	-	<2	-	1.0	-	0.08	0.1	-	-
SC-5	07/13/00	FGL	3,620	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SC-5	08/23/00	FGL	3,770	2,110	7.6	200	25.4	52	6	726	7	280	800	240	<0.4	0.2	-	-	1.0	<0.01	0.11	0.16	-	0.06
SC-5	06/27/01	FGL/OBI	3,970	2,140	8.0	200	24.3	59	7	742	9	390	890	240	<0.4	0.2	<2	-	1.1	<0.01	0.15	0.19	7	<0.4
SC-6	08/25/99	FGL	2,820	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SC-6	09/22/99	FGL	2,680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SC-6	07/13/00	FGL	2,740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SC-6	06/26/01	FGL/OBI	2,770	1,560	8.0	190	27.7	25	2	536	6	200	610	240	<0.4	0.3	<2	-	0.7	<0.01	<0.05	0.09	5	<0.4
<b>Meyers Farming</b>																								
MS-5	03/15/99	BSK	2,600	1,600	-	-	-	-	-	-	-	610	-	-	-	-	-	-	0.9	-	-	-	-	
MS-5	03/22/99	BSK	2,800	1,700	-	-	-	-	-	-	-	650	-	-	-	-	-	-	0.9	-	-	-	-	
MS-5	03/23/99	TL	-	1,700	-	-	-	-	-	-	-	600	-	-	-	-	-	-	0.8	-	-	-	-	
MS-5	08/05/99	FGL	2,940	1,710	8.3	-	24.0	26	12	590	3	220	570	390	<0.4	-	<2	-	0.8	-	<0.05	0.09	-	-
MS-5	08/25/99	FGL	2,970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-5	09/22/99	FGL	2,820	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-5	09/27/99	FGL	3,060	1,750	5.2	-	23.8	27	11	580	3	250	620	410	<0.4	-	<2	-	0.9	-	<0.05	0.1	-	-
MS-5	07/13/00	FGL	2,970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-5	08/24/00	FGL	2,890	1,670	8.0	340	20.5	28	16	548	2	300	450	390	<0.4	0.2	-	-	0.8	0.02	0.08	0.12	-	0.16
MS-5	06/26/01	FGL/OBI	3,030	1,790	8.1	310	23.7	28	13	604	3	333	549	380	<0.4	0.4	<2	-	0.87	<0.01	0.07	0.11	22	<0.4
MS-5	09/10/01	TL	3,000	1,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	18	
MS-5	10/03/01	FGL/OBI	3,130	1,820	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	
MS-5	06/27/02	FGL/OBI	3,110	1,860	8.4	290	22.0	32	14	592	3	320	670	360	<0.4	0.3	<2	-	0.8	<0.01	0.06	0.12	16.6	<0.4
MS-5	08/20/02	FGL	3,190	1,890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-5	08/20/02	TL	3,200	1,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MS-5	08/20/02	CLS	3,200	1,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Farmers Water Dist.</b>																								
R-1	06/25/01	FGL/OBI	430	270	8.8	110	12.5	2	<1	87	<1	45	34	130	<0.1	0.1	<2	-	0.1	<0.01	0.11	<0.01	5	<0.4
R-1	10/02/01	FGL/OBI	444	290	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	
R-1	06/17/02	TL	240	160	8.6	84	13.7	1	0.1	56	<1	23	8.6	100	<2.0	-	-	<0.01	<0.05	<0.05	<0.1	<0.03	-	<0.05
R-1	08/20/02	FGL/OBI	436	290	8.8	110	13.7	2	<1	95	<1	42	35	140	<0.4	<0.1	-	0.1	<0.01	0.08	<0.01	5.8	<0.4	<0.02
R-1	08/20/02	TL	440	260	-	-	15.9	2	0.3	95	1	46	35	130	-	-	-	-	-	-	-	-	-	-
R-1	08/20/02	CLS	430	270	-	110	11.9	2	<1	87	<1	47	35	122	-	-	-	-	-	-	-	-	-	-
R-2	07/31/87	BCL	410	275	8.4	-	15.7	1	<1	93	1	20	39	131	<1	0.4	<10	<0.5	0.2	-	0.17	<0.01	-	-
R-2	10/20/93	NA	555	346	8.8	-	-	<3	<2	120	<1	47	48	-	-	-	-	-	-	-	-	-	-	-
R-2	10/02/01	FGL/OBI	458	270	8.8	110	7.4	9	<1	88	1	56	41	130	<0.4	<0.1	<2	-	0.1	<0.01	<0.05	0.01	2.0	<0.4
R-2	06/17/02	TL	540	330	8.4	130	28.0	1	0.2	130	1	52	48	160	<2.0	-	-	<0.01	0.1	<0.05	0.13	<0.03	-	<0.05
R-3	07/31/87	BCL	560	365	8.3	-	-	3	<1	155	1	39	38	217	<1	0.2	<10	<0.1	0.1	-	0.06	0.03	-	-
R-3	10/02/01	FGL/OBI	776	460	8.4	240	11.5	12	2	163	1	78	55	300	<0.4	<0.1	<2	-	0.1	<0.01	0.07	0.08	1.4	<0.4
R-3	06/25/02	FGL/OBI	770	500	8.3	230	11.4	11	2	157	1	76	57	280	<0.4	<0.1	<2	-	0.2	<0.01	<0.05	0.06	<1.0	<0.4
R-3	08/20/02	FGL	778	520	7.9	230	11.5	12	2	164	1	80	59	280	<0.4	<0.1	0.021	0.1	<0.01	0.08	0.08	-	<0.02	
R-3	08/20/02	TL	790	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R-3	08/20/02	CLS	740	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R-4	10/01/01	FGL/OBI	252	180	9.2	90	9.3	1	<1	55	<1	15	13	100	<0.4	0.2	3	-	0.1	<0.01	0.14	<0.01	3.1	<0.4
R-4	06/17/02	TL	240	150	8.7	84	13.7	1	0.1	56	<1	23	8.7	100	<2.0	-	-	<0.01	<0.05	<0.05	0.48	<0.03	-	<0.05

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
R-6	10/01/01	FGL	558	350	8.7	110	10.1	7	<1	108	1	58	67	140	<0.4	0.2	<2	-	0.2	<0.01	0.06	0.03	6.1	<0.4	<0.02
R-6	06/17/02	TL	480	290	8.2	100	6.3	14	1.4	93	2	47	51	130	<2.0	-	-	0.011	0.1	<0.05	0.88	0.086	-	-	<0.05
R-7	10/01/01	FGL/OBL	476	300	8.7	110	7.4	9	<1	88	1	58	43	130	<0.4	<0.1	<2	-	<0.05	<0.01	<0.05	0.02	1.8	<0.4	<0.02
R-7	06/17/02	TL	470	280	8.4	100	9.0	8	0.5	98	2	55	42	130	<2.0	-	-	<0.01	0.1	<0.05	<0.1	<0.03	-	-	<0.05
R-8	10/02/01	FGL/OBL	587	340	8.9	130	15.5	3	<1	121	1	59	66	160	<0.4	0.3	<2	-	0.2	<0.01	0.12	<0.01	8.4	<0.4	<0.02
R-8	06/17/02	TL	240	170	8.7	80	9.0	1	<0.1	54	<1	23	8.5	98	<2.0	-	-	<0.01	<0.05	<0.05	0.1	<0.03	-	-	<0.05
R-8	08/20/02	FGL/OBL	616	420	8.7	140	18.3	2	<1	127	1	55	74	170	<0.4	0.2	-	0.2	<0.01	0.15	<0.01	8.7	<0.4	<0.02	
R-8	08/20/02	TL	-	-	-	-	18.7	2	0.3	130	3	56	70	160	-	-	-	-	-	-	-	-	-	-	
R-8	08/21/02	CLS	620	380	-	140	17.1	2	<1	120	1	61	72	159	-	-	-	-	-	-	-	-	-	-	
R-9	06/17/02	TL	710	440	8.4	140	23.0	3	0.4	160	4	23	8.6	180	<2.0	-	-	0.011	0.3	<0.05	<0.1	<0.03	-	-	<0.05
R-10	10/02/01	FGL/OBL	810	510	8.7	170	22.5	3	<1	176	2	76	104	200	<0.4	0.5	<2	-	0.5	<0.01	0.07	<0.01	15.5	<0.4	<0.02
R-10	06/17/02	TL	800	490	8.4	180	28.4	3	0.3	190	4	74	100	220	<2.0	-	-	0.01	0.5	<0.05	<0.1	<0.03	-	-	<0.05
R-11	08/24/00	FGL	808	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R-11	06/25/01	FGL/OBL	739	470	8.6	150	22.1	2	<1	153	2	41	102	190	<0.1	0.4	<2	-	0.4	<0.01	0.09	<0.01	12	<0.4	<0.02
R-11	06/25/02	FGL/OBL	737	460	8.6	150	21.0	2	<1	146	2	34	106	190	<0.4	0.3	<2	-	0.4	<0.01	<0.05	<0.01	9.3	<0.4	<0.02
R-11	08/20/02	FGL	535	370	8.7	140	-	<1	<1	115	<1	5	84	170	0.5	0.3	-	0.004	0.3	<0.01	0.15	<0.01	-	-	<0.02
R-11	08/20/02	TL	540	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R-11	08/20/02	CLS	520	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Baker Farming Co.</b>																									
BF-1	08/25/99	FGL	549	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BF-1	09/22/99	FGL	686	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BF-1	10/01/01	FGL/OBL	497	300	8.9	120	17.3	1	<1	102	<1	44	53	140	<0.4	0.2	<2	-	0.1	<0.01	0.08	<0.01	3.9	<0.4	<0.02
BF-1	06/26/02	FGL/OBL	555	380	8.7	120	15.9	2	<1	110	2	44	64	150	<0.4	0.2	<2	-	0.2	<0.01	0.08	<0.01	5.9	<0.4	<0.02
BF-2	08/25/99	FGL	533	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BF-2	06/25/01	FGL/OBL	497	300	8.6	100	12.4	3	<1	97	<1	46	56	130	<0.1	0.1	<2	-	0.1	0.08	0.19	<0.01	2	<0.4	<0.02
BF-2	06/26/02	FGL/OBL	496	310	8.6	100	12.5	3	<1	98	1	42	58	130	<0.4	<0.1	<2	-	0.1	<0.01	<0.05	<0.01	3.1	<0.4	<0.02
BF-3	10/01/01	FGL/OBL	511	310	8.8	120	11.7	4	<1	101	<1	44	59	140	<0.4	<0.1	<2	-	0.1	<0.01	0.06	0.01	3.5	<0.4	<0.02
BF-4	09/22/99	FGL	562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BF-4	10/02/01	FGL/OBL	539	310	8.8	130	13.3	3	<1	104	1	43	64	150	<0.4	<0.1	<2	-	0.1	<0.01	<0.05	0.03	3.0	<0.4	<0.02
BF-5	10/01/01	FGL/OBL	462	300	8.5	100	6.0	10	2	80	1	37	56	130	<0.4	<0.1	<2	-	0.1	<0.01	0.08	0.03	3.8	<0.4	<0.02
<b>Panoche Creek Farms</b>																									
PCF-1	06/25/01	FGL	534	340	8.6	150	12.7	4	<1	110	1	38	51	180	<0.1	0.2	<2	-	0.2	<0.01	0.18	0.02	3	<0.4	<0.02
PCF-1	10/01/01	FGL	535	340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
PCF-1	06/26/02	FGL	575	390	8.6	160	13.0	4	<1	112	1	37	57	190	<0.4	0.1	<2	-	0.2	<0.01	<0.05	0.02	4.8	<0.4	<0.02
<b>Newhall Land &amp; Farming</b>																									
No. 32	08/28/53	AT	-	277	8.1	-	6.2	6	3.5	77	-	41	39	168	-	-	-	0.0	-	-	-	-	-	-	-
No. 32	05/18/79	AT	600	380	7.9	-	-	-	-	106	-	43	275	-	-	-	0.3	-	-	-	-	-	-	-	
No. 32	08/04/79	AT	680	440	8.0	-	-	-	-	124	-	60	287	-	-	-	0.5	-	-	-	-	-	-	-	
No. 32	11/08/94	BSK	970	-	7.8	-	4.7	-	-	154	-	99	262	28	-	-	0.3	-	-	-	-	-	-	-	
No. 32	04/03/95	BSK	980	-	8.2	-	4.7	-	-	152	-	99	275	28	-	-	0.3	-	-	-	-	-	-	-	
No. 32	09/15/95	BSK	1,080	-	8.0	-	6.7	-	-	184	-	99	366	27	-	-	0.4	-	-	-	-	-	-	-	
No. 32	03/19/96	BSK	1,020	-	7.9	-	5.9	-	-	163	-	96	384	28	-	-	0.3	-	-	-	-	-	-	-	
No. 32	09/04/96	BSK	1,100	-	7.8	-	5.8	-	-	159	-	121	305	30	-	-	0.3	-	-	-	-	-	-	-	
No. 32	04/04/97	BSK	1,100	-	8.0	-	4.6	-	-	149	-	96	165	44	-	-	0.3	-	-	-	-	-	-	-	
No. 32	07/02/97	BSK	1,100	-	8.6	-	6.6	-	-	182	-	82	574	54	-	-	0.3	-	-	-	-	-	-	-	
No. 32	04/17/01	JML	1,100	-	7.7	-	6.4	-	-	198	-	124	366	56	-	-	0.3	-	-	-	-	-	-	-	
No. 32	09/14/01	JML	1,210	-	7.3	-	4.8	-	-	184	-	117	421	53	-	-	0.2	-	-	-	-	0.73	-	-	

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations				Anions					Trace Elements												
			EC <sup>2</sup> (µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (µg/L)
No. 32	08/15/02	JML	830	-	8.0	-	10.6	-	-	191	-	-	64	293	2	-	-	0.1	-	-	-	-	<0.5	-
No. 42	11/08/94	BSK	1,050	-	7.8	-	5.4	-	-	184	-	-	135	244	21	-	-	0.5	-	-	-	-	-	-
No. 42	04/03/95	BSK	1,040	-	8.0	-	3.3	-	-	85	-	-	117	275	4	-	-	0.1	-	-	-	-	-	-
No. 42	09/15/95	BSK	1,280	-	8.0	-	8.0	-	-	218	-	-	149	397	27	-	-	0.4	-	-	-	-	-	-
No. 42	03/19/96	BSK	1,110	-	7.9	-	7.9	-	-	198	-	-	124	336	20	-	-	0.5	-	-	-	-	-	-
No. 42	09/04/96	BSK	1,100	-	7.8	-	9.1	-	-	191	-	-	142	287	22	-	-	0.5	-	-	-	-	-	-
No. 42	04/04/97	BSK	1,100	-	8.0	-	7.0	-	-	182	-	-	131	134	27	-	-	0.5	-	-	-	-	-	-
No. 42	07/02/97	BSK	1,100	-	8.5	-	9.3	-	-	205	-	-	96	714	48	-	-	0.5	-	-	-	-	-	-
No. 42	03/21/01	JML	1,100	-	7.7	-	9.4	-	-	218	-	-	149	329	34	-	-	0.4	-	-	-	-	-	-
No. 42	09/14/01	JML	1,130	-	7.5	-	9.3	-	-	221	-	-	145	384	20	-	-	0.4	-	-	-	-	-	-
No. 42	08/15/02	JML	1,200	-	7.7	-	6.2	-	-	205	-	-	121	378	6	-	-	0.3	-	-	-	-	<0.5	-
No. 53	01/28/64	UAG	225	160	7.8	-	-	-	-	56	-	-	23	164	-	-	-	0.2	-	-	-	-	-	-
No. 53	11/08/94	BSK	530	-	8.3	-	3.1	-	-	76	-	-	71	92	4	-	-	0.2	-	-	-	-	-	-
No. 53	04/03/95	BSK	550	-	8.3	-	3.9	-	-	85	-	-	71	122	4	-	-	0.1	-	-	-	-	-	-
No. 53	09/15/95	BSK	540	-	8.3	-	5.2	-	-	92	-	-	39	140	7	-	-	0.1	-	-	-	-	-	-
No. 53	03/19/96	BSK	570	-	8.4	-	4.4	-	-	92	-	-	78	244	2	-	-	0.1	-	-	-	-	-	-
No. 53	09/04/96	BSK	600	-	8.2	-	5.2	-	-	83	-	-	82	92	2	-	-	0.1	-	-	-	-	-	-
No. 53	04/04/97	BSK	600	-	8.3	-	3.5	-	-	78	-	-	74	55	4	-	-	0.2	-	-	-	-	-	-
No. 53	07/02/97	BSK	600	-	8.3	-	6.5	-	-	108	-	-	64	177	14	-	-	0.1	-	-	-	-	-	-
No. 53	09/97	BSK	500	-	8.2	-	-	-	-	-	-	-	97	57	110	4	-	0.1	-	-	-	-	-	-
No. 53	03/98	BSK	565	-	8.3	-	-	-	-	21	1	97	83	-	<2	-	0.1	-	-	-	<0.5	-	-	
No. 53	09/98	BSK	610	-	8.3	-	-	-	-	-	-	97	64	-	3	-	0.1	-	-	-	<0.5	-	-	
No. 53	03/99	BSK	570	-	8.1	-	-	-	-	-	-	122	57	134	6	-	0.1	-	-	-	<0.5	-	-	
No. 53	09/99	BSK	600	-	8.2	-	-	-	-	-	-	110	71	153	3	-	0.1	-	-	-	1.2	-	-	
No. 53	03/21/00	JML	530	-	8.1	122	6.4	22	2	117	-	56	105	-	2	-	0.0	-	-	-	<0.4	-	-	
No. 53	10/03/00	JML	520	-	8.2	121	5.5	27	2	110	-	54	71	-	-	-	0.1	-	-	-	<0.4	-	-	
No. 53	03/21/01	JML	540	-	8.2	115	5.6	19	3	99	-	49	75	-	-	-	0.1	-	-	-	<0.4	-	-	
No. 53	06/26/01	JML	530	-	8.3	120	6.6	18	ND	102	-	49	78	-	-	-	0.1	-	-	-	-	-	-	
No. 53	09/14/01	JML	580	-	8.1	-	5.5	-	-	97	-	-	71	262	ND	-	-	0.1	-	-	-	-	-	-
No. 53	08/15/02	JML	1,200	-	7.6	-	10.1	-	-	262	-	-	145	354	6	-	-	0.4	-	-	-	<0.5	-	-
No. 74	01/27/75	TL	-	684	8.1	-	20.0	7	1	214	-	124	156	168	-	-	-	0.3	-	-	-	-	-	-
No. 74	11/08/94	BSK	1,000	-	8.1	-	11.4	-	-	177	-	-	152	122	4	-	-	0.6	-	-	-	-	-	-
No. 74	04/03/95	BSK	1,020	-	8.0	-	11.9	-	-	193	-	-	145	153	4	-	-	0.8	-	-	-	-	-	-
No. 74	09/15/95	BSK	1,090	-	8.2	-	23.9	-	-	223	-	-	163	140	2	-	-	0.8	-	-	-	-	-	-
No. 74	03/19/96	BSK	980	-	8.2	-	13.9	-	-	202	-	-	138	244	4	-	-	0.8	-	-	-	-	-	-
No. 74	09/04/96	BSK	1,000	-	8.0	-	36.7	-	-	189	-	-	149	122	3	-	-	0.6	-	-	-	-	-	-
No. 74	04/04/97	BSK	1,000	-	8.2	-	11.5	-	-	179	-	-	128	43	5	-	-	0.6	-	-	-	-	-	-
No. 74	07/02/97	BSK	1,000	-	8.4	-	23.6	-	-	218	-	-	96	214	15	-	-	0.7	-	-	-	-	-	-
No. 74	09/97	BSK	1,000	-	8.0	-	-	-	-	209	-	-	89	153	9	-	-	0.7	-	-	-	-	-	-
No. 74	03/98	BSK	964	-	8.0	-	-	2	<1	198	-	-	118	-	1	-	-	0.6	-	-	-	<0.5	-	-
No. 74	09/98	BSK	1,070	-	8.3	-	-	-	-	205	-	-	124	-	4	-	-	0.6	-	-	-	<0.5	-	-
No. 74	03/99	BSK	950	-	7.9	-	-	-	-	248	-	-	92	159	5	-	-	0.7	-	-	-	1	-	-
No. 74	09/99	BSK	1,050	-	8.0	-	-	-	-	243	-	-	138	171	2	-	-	0.6	-	-	-	<0.5	-	-
No. 74	03/21/00	JML	920	-	7.9	135	21.3	7	<1	227	-	123	171	-	2	-	-	0.5	-	-	-	<0.4	-	-
No. 74	10/03/00	JML	930	-	7.8	202	17.1	12	<1	230	-	145	140	-	-	-	0.7	-	-	-	<0.4	-	-	
No. 74	03/21/01	JML	950	-	8.0	136	20.5	6	1	206	-	126	155	-	-	-	0.6	-	-	-	<0.4	-	-	
No. 74	06/28/01	JML	980	-	8.1	88	-	2	ND	157	-	82	178	-	-	-	-	0.5	-	-	-	-	-	-
No. 74	09/14/01	JML	940	-	7.8	-	21.3	-	-	202	-	-	142	232	ND	-	-	0.6	-	-	-	-	-	-
No. 74	08/15/02	JML	570	-	8.2	-	6.4	-	-	115	-	-	67	146	-	-	-	0.1	-	-	-	<0.5	-	-
No. 78	04/13/76	TL	-	314	8.0	-	12.9	2	2	108	-	42	64	137	1	-	-	0.6	-	-	-	-	-	-

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations				Anions					Trace Elements												
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)
No. 78	07/21/77	TL	337	-	8.4	-	11.4	2	1	79	-	39	35	64	1	-	-	0.3	-	-	-	-	-	
No. 78	11/08/94	BSK	430	-	8.6	-	8.4	-	-	87	-	-	57	110	4	-	-	-	0.2	-	-	-	-	-
No. 78	04/03/95	BSK	360	-	8.6	-	NA	-	-	78	-	-	53	92	3	-	-	-	0.2	-	-	-	-	-
No. 78	09/15/95	BSK	390	-	8.3	-	19.8	-	-	85	-	-	21	122	8	-	-	-	0.2	-	-	-	-	-
No. 78	03/19/96	BSK	390	-	8.7	-	7.8	-	-	87	-	-	53	122	2	-	-	-	0.2	-	-	-	-	-
No. 78	09/04/96	BSK	500	-	8.6	-	24.7	-	-	85	-	-	43	85	2	-	-	-	0.2	-	-	-	-	-
No. 78	04/04/97	BSK	400	-	8.5	-	5.9	-	-	74	-	-	39	37	3	-	-	-	0.2	-	-	-	-	-
No. 78	07/02/97	BSK	400	-	8.4	-	46.0	-	-	106	-	-	43	177	14	-	-	-	0.1	-	-	-	-	-
No. 78	09/97	BSK	400	-	8.5	-	-	-	-	94	-	-	32	110	8	-	-	-	0.1	-	-	-	-	-
No. 78	03/98	BSK	396	-	8.5	-	-	<1	<1	88	-	-	75	-	<2	-	-	-	0.1	-	-	-	<0.5	-
No. 78	09/98	BSK	480	-	8.5	-	-	-	-	94	-	-	39	-	5	-	-	-	0.2	-	-	-	<0.5	-
No. 78	03/99	BSK	410	-	8.5	-	-	-	-	120	-	-	43	122	11	-	-	-	0.2	-	-	-	<0.5	-
No. 78	09/99	BSK	500	-	8.2	-	-	-	-	117	-	-	46	146	3	-	-	-	0.2	-	-	-	1.4	-
No. 78	03/21/00	JML	400	-	8.5	113	13.9	3	<1	109	-	-	38	58	-	3	-	-	0.1	-	-	-	<0.4	-
No. 78	10/03/00	JML	450	-	8.3	116	11.3	7	<1	121	-	-	51	55	-	-	-	-	0.2	-	-	-	<0.4	-
No. 78	03/21/01	JML	450	-	7.4	109	16.8	1	<1	99	-	-	44	54	-	-	-	-	0.1	-	-	-	<0.4	-
No. 78	06/26/01	JML	400	-	8.5	112	16.4	1	ND	97	-	-	32	50	-	-	-	-	0.1	-	-	-	-	-
No. 78	09/14/01	JML	430	-	8.3	-	29.2	-	-	94	-	-	46	140	ND	-	-	-	0.1	-	-	-	-	-
No. 78	08/15/02	JML	1,000	-	7.9	-	23.4	-	-	232	-	-	138	165	-	-	-	-	0.6	-	-	-	<0.5	-
No. 89	11/08/94	BSK	890	-	7.7	-	2.4	-	-	122	-	-	85	250	19	-	-	-	0.3	-	-	-	-	-
No. 89	04/03/95	BSK	920	-	8.1	-	2.7	-	-	138	-	-	96	262	17	-	-	-	0.2	-	-	-	-	-
No. 89	09/15/95	BSK	980	-	8.1	-	2.5	-	-	168	-	-	89	366	15	-	-	-	0.2	-	-	-	-	-
No. 89	03/19/96	BSK	940	-	8.2	-	2.4	-	-	161	-	-	85	293	17	-	-	-	0.2	-	-	-	-	-
No. 89	09/04/96	BSK	900	-	7.8	-	2.6	-	-	154	-	-	92	305	26	-	-	-	0.2	-	-	-	-	-
No. 89	04/04/97	BSK	1,000	-	7.9	-	1.9	-	-	152	-	-	67	201	22	-	-	-	0.1	-	-	-	-	-
No. 89	07/02/97	BSK	1,000	-	8.6	-	1.8	-	-	166	-	-	64	470	42	-	-	-	0.2	-	-	-	-	-
No. 89	09/14/01	JML	1,050	-	7.4	-	5.9	-	-	175	-	-	89	378	24	-	-	-	0.2	-	-	-	0.9	-
No. 89	08/15/02	JML	810	-	8.0	-	14.8	-	-	186	-	-	89	250	1	-	-	-	0.3	-	-	-	1.0	-
No. 91	11/08/94	BSK	890	-	7.7	-	4.7	-	-	163	-	-	106	238	27	-	-	-	0.3	-	-	-	-	-
No. 91	04/03/95	BSK	840	-	7.7	-	6.1	-	-	133	-	-	96	232	27	-	-	-	0.3	-	-	-	-	-
No. 91	09/15/95	BSK	980	-	8.1	-	7.2	-	-	172	-	-	103	305	24	-	-	-	0.3	-	-	-	-	-
No. 91	03/19/96	BSK	950	-	8.0	-	6.5	-	-	166	-	-	96	323	27	-	-	-	0.2	-	-	-	-	-
No. 91	09/04/96	BSK	1,600	-	7.9	-	12.1	-	-	274	-	-	284	250	18	-	-	-	0.2	-	-	-	-	-
No. 91	04/04/97	BSK	1,000	-	8.0	-	5.3	-	-	143	-	-	92	140	19	-	-	-	0.3	-	-	-	-	-
No. 91	07/02/97	BSK	1,300	-	8.6	-	11.3	-	-	267	-	-	128	445	50	-	-	-	0.3	-	-	-	-	-
No. 91	03/21/01	JML	1,000	-	7.7	-	6.9	-	-	172	-	-	110	360	46	-	-	-	0.2	-	-	-	-	-
No. 91	09/14/01	JML	1,020	-	7.7	-	6.1	-	-	175	-	-	106	348	31	-	-	-	0.2	-	-	-	-	-
No. 91	08/15/02	JML	420	-	8.3	-	28.4	-	-	113	-	-	50	128	-	-	-	0.1	-	-	-	0.4	-	
No. 94	11/08/94	BSK	480	-	8.8	-	8.3	-	-	85	-	-	64	110	3	-	-	-	0.3	-	-	-	-	-
No. 94	04/03/95	BSK	390	-	8.8	-	7.7	-	-	78	-	-	35	92	4	-	-	-	0.2	-	-	-	-	-
No. 94	09/15/95	BSK	650	-	8.6	-	6.5	-	-	110	-	-	64	171	1	-	-	-	0.3	-	-	-	-	-
No. 94	03/19/96	BSK	500	-	8.8	-	9.0	-	-	106	-	-	64	110	2	-	-	-	0.3	-	-	-	-	-
No. 94	09/04/96	BSK	500	-	8.7	-	0.0	-	ND	94	-	-	57	79	6	-	-	-	0.3	-	-	-	-	-
No. 94	04/04/97	BSK	500	-	8.6	-	1.7	-	-	90	-	-	53	43	4	-	-	-	0.3	-	-	-	-	-
No. 94	07/02/97	BSK	400	-	8.5	-	30.1	-	-	108	-	-	43	177	19	-	-	-	0.2	-	-	-	-	-
No. 94	09/97	BSK	400	-	8.6	-	-	-	-	92	-	-	32	110	11	-	-	-	0.2	-	-	-	-	-
No. 94	03/98	BSK	403	-	8.3	-	-	<1	<1	92	-	-	59	-	0	-	-	-	0.2	-	-	-	<0.5	-
No. 94	09/98	BSK	450	-	8.6	-	-	-	-	92	-	-	35	-	11	-	-	-	0.2	-	-	-	<0.5	-
No. 94	03/99	BSK	380	-	8.6	-	-	-	-	113	-	-	32	134	14	-	-	-	0.2	-	-	-	<0.5	-
No. 94	09/99	BSK	440	-	8.5	-	-	-	-	108	-	-	35	159	2	-	-	-	0.2	-	-	-	1.3	-
No. 94	03/21/00	JML	410	-	8.6	123	17.7	2	<1	123	-	-	40	21	-	3	-	-	0.1	-	-	-	<0.4	-

**Table C-2**  
**Summary of Ground-Water Quality Laboratory Results (Deep Wells)**

Well Owner & Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
No. 94	10/03/00	JML	410	-	8.5	129	10.4	7	<1	111	-	39	39	-	-	-	-	0.1	-	-	-	-	<0.4	-	
No. 94	03/29/01	JML	400	-	8.8	-	14.5	-	-	97	-	-	35	146	ND	-	-	-	0.1	-	-	-	-	-	-
No. 94	06/22/01	JML	450	-	8.5	145	33	1	ND	120	-	37	48	-	-	-	-	0.1	-	-	-	-	-	-	
No. 94	09/14/01	JML	380	-	8.5	-	24.3	-	-	87	-	-	35	153	ND	-	-	0.1	-	-	-	-	-	-	
No. 94	08/15/02	JML	1,110	-	7.8	-	6.6	-	-	214	-	-	82	391	6	-	-	0.2	-	-	-	-	<0.5	-	
No. 95	09/97	BSK	200	-	8.9	-	-	-	-	57	-	-	14	110	11	-	-	0.1	-	-	-	-	-	-	
No. 95	03/98	BSK	305	-	8.7	-	-	<1	<1	70	-	-	3	-	4	-	-	0.1	-	-	-	-	<0.5	-	
No. 95	09/98	BSK	310	-	8.7	-	-	-	-	67	-	-	21	-	10	-	-	0.1	-	-	-	-	<0.5	-	
No. 95	03/99	BSK	300	-	8.6	-	-	-	-	90	-	-	21	128	14	-	-	0.1	-	-	-	-	<0.5	-	
No. 95	09/99	BSK	280	-	8.6	-	-	-	-	7	-	-	18	134	1	-	-	0.1	-	-	-	-	0.8	-	
No. 95	03/21/00	JML	240	-	8.8	106	11.2	2	<1	78	-	45	21	-	3	-	-	0.0	-	-	-	-	<0.4	-	
No. 95	10/03/00	JML	230	-	8.6	105	6.9	6	<1	69	-	23	12	-	-	-	-	0.1	-	-	-	-	<0.4	-	
No. 95	03/29/01	JML	560	-	8.6	-	8.9	-	-	60	-	-	11	116	ND	-	-	0.1	-	-	-	-	-	-	
No. 95	06/22/01	JML	240	-	8.6	100	ND	ND	ND	62	-	6	13	-	-	-	-	0.1	-	-	-	-	-	-	
No. 95	09/14/01	JML	250	-	8.6	-	25.0	-	-	57	-	-	14	128	ND	-	-	0.1	-	-	-	-	-	-	
No. 95	08/15/02	JML	1,250	-	7.9	-	9.0	-	-	248	-	-	160	354	7	-	-	0.2	-	-	-	-	<0.5	-	
MW-1	06/11/02	JML	670	-	7.4	-	2.8	-	-	90	-	-	82	183	ND	-	-	0.2	-	-	-	-	-	-	

1. Laboratory Abbreviations: USGS - U.S. Geological Survey; FGL - Fruit Growers Laboratory, Santa Paula; OBL - Olson Biochemistry Laboratories of South Dakota State University, Brookings, SD (shown in *italics* where not identified with laboratory abbreviation Se and Mo only); BSK - BSK Analytical Laboratories, Fresno; TL - The Twining Laboratories, Inc., Fresno; BCL - BC Laboratories, Bakersfield; JML - JM Lord, Fresno (Selenium analyses by Olson Biochemistry Laboratories); AT - Agri Tech, Inc., Kerman; UAG - U.S. Agricultural Consultants and Laboratories, Burbank; CLS - California Laboratory Services, Rancho Cordova

2. Electrical Conductivity at 25°C

3. HCO<sub>3</sub>, total alkalinity and NO<sub>3</sub> reported as HCO<sub>3</sub>, CaCO<sub>3</sub> and NO<sub>3</sub>, respectively.

4. Only selenium results analysed with a detection limit ≤0.5 μg/L are reported.

5. Cardella-1 also known as Cardella-Lopes.

6. Lopes-1 also known as Cardella-2 or Cardella-Newstone.

NA = Not Available; ND = Non Detect (detection limit unknown)

**Table C-3**  
**Summary of Ground-Water Quality Laboratory Results: City of Mendota Wells**

Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
No. 2	07/10/79	TL	988	564	8.1	169.1	2.7	33	35	94	-	98	135	168	0.1	0.55	<5	<0.5	-	<0.05	0.49	0.38	-	-	<0.05
No. 2	09/15/80	BSK	928	612	7.9	182	6.5	27	7.3	148	2	63	124	222	<1	0.49	-	-	0.25	<0.02	0.4	0.26	-	-	<0.1
No. 2	02/22/82	NA	945	542	-	-	-	-	-	-	-	115	134	-	-	-	-	-	-	-	-	-	-	-	
No. 2	04/08/83	NA	875	553	-	-	-	-	-	-	-	60	136	-	-	-	-	-	-	-	-	-	-	-	
No. 2	04/21/86	NA	897	648	7.9	-	8.8	25.5	5.4	188	-	170	162	207	1.0	0.34	<1	<0.08	-	<0.01	0.19	0.328	-	-	<0.01
No. 2	11/19/87	BCL	1,300	800	-	-	7.6	48	11	224	3	199	190	229	<1	0.3	<10	-	-	-	0.4	0.55	-	-	-
No. 2	09/15/89	NA	1,600	930	7.9	-	9.2	54	10	280	-	260	250	210	<1	0.3	<5	<0.10	-	<0.05	0.27	0.60	-	-	<0.05
No. 2	06/07/90	NA	2,200	1,300	-	-	-	-	-	-	-	390	320	-	-	-	-	-	-	-	-	-	-	-	
No. 2	02/15/91	NA	2,200	1,500	7.6	-	5.2	140	40	270	-	470	260	300	<2	0.1	-	-	-	-	-	-	-	-	
No. 2	04/04/91	NA	2,100	1,300	7.7	-	5.0	140	40	260	-	490	260	270	<1	0.1	<5	<0.10	-	<0.05	1.40	1.30	-	-	<0.05
No. 2	10/10/91	NA	2,400	1,500	-	-	-	-	-	-	-	500	320	-	-	-	-	-	-	-	-	-	-	-	
No. 2	01/02/92	NA	2,300	1,400	-	-	-	-	-	-	-	510	280	-	-	-	-	-	-	-	-	-	-	-	
No. 2	08/06/92	NA	2,400	1,500	-	-	-	-	-	-	-	500	340	-	-	-	-	-	-	-	-	-	-	-	
No. 2	08/05/93	NA	2,500	1,600	8.0	-	9.8	100	24	420	-	490	390	280	<2	0.2	<2	0.078	-	<0.05	0.58	1.0	-	-	<0.05
No. 2	02/22/94	NA	2,000	1,400	7.6	-	5.3	130	42	270	-	490	220	330	<2	0.1	<2	<0.10	-	0.059	2.0	1.60	-	-	<0.05
No. 2	07/06/95	NA	2,700	1,700	7.6	-	10.1	100	26	440	-	430	340	240	<2	0.4	<2	<0.10	-	<0.05	0.62	1.10	-	-	<0.05
No. 2	10/05/95	NA	2,200	1,600	7.9	-	9.8	100	24	420	-	440	400	280	<2	0.1	3	<0.10	-	<0.05	0.72	0.99	-	-	<0.05
No. 2	01/04/96	BSK	2,000	1,300	7.5	-	10.6	94	23	440	5	530	380	270	2.0	0.6	<2	<0.10	-	<0.05	0.62	0.09	-	-	<0.05
No. 2	02/25/98	BCL	1,340	830	7.8	-	6.9	56	13	220	ND	210	200	216	<0.4	0.29	<10	<0.1	0.44	<0.01	0.15	0.01	-	-	<0.01
No. 2	05/04/01	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60	0.2	-	-	-	
No. 3	03/05/90	BCL	630	410	8.0	-	7.8	13	3	120	2.1	70	80	155	<1	0.33	<0.01	<0.1	0.25	-	0.29	0.25	-	-	-
No. 3	05/02/90	BSK	780	390	8.1	130	5.9	45	2.5	150	2.2	96	100	160	<1	0.2	-	-	-	-	-	-	-	-	-
No. 3	06/07/90	BSK	1,200	650	8.2	160	13.1	17	2.7	220	-	130	160	200	<1	0.4	<5	<0.1	-	<0.05	0.86	0.43	-	-	<0.05
No. 3	07/06/90	BSK	1,300	750	7.9	160	12.1	26	5.3	260	-	210	190	190	<1	0.3	<5	<0.1	-	<0.05	1	0.58	-	-	<0.05
No. 3	08/09/90	NA	1,400	830	-	-	-	-	-	-	-	220	230	-	-	-	-	-	-	-	-	-	-	-	
No. 3	02/06/92	NA	1,600	1,000	-	-	-	-	-	-	-	280	210	-	-	-	-	-	-	-	-	-	-	-	
No. 3	11/05/92	NA	2,000	1,300	-	-	-	-	-	-	-	380	290	-	-	-	-	-	-	-	-	-	-	-	
No. 3	01/14/93	NA	2,100	1,300	7.6	-	9.7	84	13	360	-	250	320	<1	<1	0.2	<2	0.091	-	<0.05	0.71	0.86	-	-	<0.001
No. 3	02/04/93	NA	2,000	1,300	-	-	9.7	84	13	360	-	380	300	-	-	-	-	-	-	-	-	-	-	-	
No. 3	04/01/93	NA	2,100	1,300	8.0	-	10.9	67	10	360	-	360	320	230	<1	0.4	<2	<0.1	-	<0.05	<0.1	<0.01	-	-	<0.05
No. 3	01/12/94	NA	1,800	1,200	7.8	-	9.3	66	11	310	-	290	290	220	<1	0.2	<2	<0.1	-	<0.05	0.76	0.61	-	-	<0.05
No. 3	02/03/94	NA	2,000	1,300	8.6	-	10.1	71	12	350	-	310	330	220	<1	0.3	<2	<0.1	-	<0.05	0.86	0.69	-	-	<0.05
No. 3	02/22/94	NA	2,000	1,200	8.0	-	10.6	69	11	360	-	410	250	260	<2	0.3	<2	<0.1	-	<0.05	0.81	0.67	-	-	<0.05
No. 3	05/16/95	NA	2,300	1,400	7.9	-	12.8	63	11	420	-	420	400	130	<2	0.4	<2	<0.1	-	<0.05	0.51	0.55	-	-	<0.05
No. 3	11/02/95	NA	1,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	0.50	-	-	-	
No. 3	04/04/96	NA	1,900	1,300	7.9	-	11.3	65	10	370	-	390	600	230	<2	<0.1	2	<0.1	-	<0.05	0.55	0.54	-	-	<0.05
No. 3	07/03/96	NA	2,000	1,200	7.8	-	-	60	9	-	-	300	360	240	<2	1.4	<2	<0.1	-	<0.05	0.49	0.48	-	-	<0.05
No. 3	10/09/96	NA	2,400	1,500	7.5	-	11.7	77	13	420	-	440	350	200	<2	<0.1	<2	<0.1	-	<0.05	0.61	0.56	-	-	<0.05
No. 3	11/14/96	NA	2,000	1,400	-	-	-	-	-	-	-	440	360	-	-	-	-	-	-	0.50	0.52	-	-	-	
No. 3	03/06/97	NA	1,700	1,200	-	-	-	-	-	-	-	300	340	-	-	-	-	-	-	0.29	0.39	-	-	-	
No. 3	04/03/97	NA	2,300	1,400	8.2	-	13.5	66	11	450	-	420	350	200	<2	<0.1	3	<0.1	-	<0.05	0.48	0.50	-	-	<0.05
No. 3	05/01/97	NA	2,300	1,400	-	-	-	-	-	-	-	420	350	-	-	-	-	-	-	0.46	0.52	-	-	-	
No. 3	06/05/97	NA	2,700	1,700	-	-	-	-	-	-	-	550	390	-	-	-	-	-	-	0.69	0.86	-	-	-	

**Table C-3**  
**Summary of Ground-Water Quality Laboratory Results: City of Mendota Wells**

Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
No. 3	07/03/97	NA	2,400	1,600	8.1	-	11.7	83	15	440	-	480	380	210	<2	<0.1	2	<0.1	-	<0.05	0.52	0.62	-	-	<0.05
No. 3	10/02/97	BSK	2,100	1,400	7.9	-	12.0	71	13	420	6	420	350	210	<2	0.3	<2	<0.1	-	-	0.42	0.54	-	-	-
No. 3	09/03/98	NA	2,400	1,500	-	-	-	-	-	-	-	440	420	-	-	-	-	-	-	-	0.26	0.32	-	-	-
No. 3	10/01/98	NA	2,400	1,500	8.1	-	12.3	80	16	460	-	440	390	210	<2	<0.1	<2	<0.1	-	<0.05	0.56	0.66	-	-	<0.05
No. 3	12/03/98	NA	2,400	1,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.59	-	-	-	
No. 3	01/07/99	NA	2,400	1,500	8.0	-	12.3	81	15	460	-	490	410	200	15	<0.1	<2	<0.1	-	<0.05	0.55	0.61	-	-	<0.05
No. 3	04/01/99	NA	2,200	1,400	8.1	-	11.5	72	18	420	-	340	380	210	<2	<0.1	4	<0.1	-	<0.05	0.31	0.56	-	-	<0.05
No. 3	07/01/99	NA	2,400	1,600	7.9	-	12.3	81	15	460	-	410	390	210	9	<0.1	<2	<0.1	-	<0.05	0.53	0.63	-	-	<0.05
No. 3	08/06/99	FGL	2,490	1,570	7.7	-	13.0	70	13	450	6	440	410	270	<0.4	-	<2	-	1.0	-	0.4	0.6	-	-	-
No. 3	09/29/99	FGL	2,500	1,540	7.8	-	11.8	73	14	420	6	440	390	280	<0.4	-	<2	-	1.1	-	0.4	0.6	-	-	-
No. 3	11/04/99	NA	2,500	1,500	-	-	-	-	-	-	-	460	400	-	-	-	-	-	-	0.39	0.51	-	-	-	
No. 3	01/06/00	BSK	2,300	1,500	7.6	200	13.9	67	12	470	6	460	380	244	<1	<2	2	0.07	-	<0.05	0.4	0.5	-	-	<0.05
No. 3	02/03/00	BSK	2,400	1,500	-	-	-	-	-	-	-	430	350	-	-	-	-	-	-	0.41	0.48	-	-	-	
No. 3	03/02/00	BSK	2,500	1,500	-	-	-	-	-	-	-	430	380	-	-	-	-	-	-	0.39	0.47	-	-	-	
No. 3	04/06/00	BSK	2,300	1,500	7.9	200	12.3	66	11	410	4	410	360	244	<1	<2.5	2	0.06	-	<0.05	0.37	0.48	-	-	<0.05
No. 3	05/04/00	NA	2,500	1,700	-	-	-	-	-	-	-	500	390	-	-	-	-	-	-	0.14	0.49	-	-	-	
No. 3	06/01/00	BSK	2,300	1,500	-	-	-	-	-	-	-	390	360	-	-	-	-	-	-	0.35	0.46	-	-	-	
No. 3	11/01/00	BSK	2,800	1,700	-	-	-	-	-	-	-	530	430	-	-	-	-	-	-	0.43	0.53	-	-	-	
No. 3	11/09/00	BSK	2,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. 3	11/16/00	BSK	2,600	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. 3	11/21/00	BSK	2,700	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. 3	11/30/00	BSK	2,600	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. 3	12/07/00	BSK	2,900	1,800	7.6	200	13.5	97	17	550	6	580	390	244	-	-	-	-	<0.05	0.5	0.67	-	-	<0.05	
No. 3	12/15/00	BSK	2,600	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. 3	12/21/00	BSK	2,700	1,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. 3	02/01/01	NA	2,600	1,600	-	-	-	-	-	-	-	-	-	-	<20	-	-	-	-	-	-	-	-	-	
No. 3	05/04/01	NA	2,000	1,200	7.9	-	-	83	18	340	-	380	240	230	-	<2	<2	<0.1	-	<0.05	0.78	0.65	-	-	<0.05
No. 3	10/02/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.1	<0.4	-	
No. 3	10/02/01	FGL	2,660	1,680	7.9	210	13.0	71	15	463	6	561	399	250	<0.4	0.2	<2	-	1.36	<0.01	0.42	0.56	-	-	<0.02
No. 3	05/13/02	NA	2,200	1,400	7.8	-	9.5	78	15	350	-	-	-	210	<30	-	-	-	<0.05	-	-	-	-	-	<0.05
No. 3	09/02/02	NA	2,560	1,546	-	-	-	-	-	-	-	703	479	-	-	-	-	-	-	0.25	0.42	-	-	-	
No. 3	01/07/03	NA	2,540	1,578	-	-	-	-	-	-	-	517	275	-	-	-	-	-	<0.1	0.40	-	-	-	-	
No. 4	09/27/90	BCL	2,020	1,230	7.7	-	12.5	54	9.6	380	3.8	336	299	262	<0.4	0.27	<2	0.002	0.72	-	<0.005	<0.01	-	-	-
No. 4	02/15/91	NA	2,300	1,400	7.9	-	7.8	120	19	350	-	440	320	270	<1	0.1	<10	0.18	-	<0.05	0.68	0.96	-	-	<0.05
No. 4	05/02/91	NA	2,300	1,400	7.8	-	8.7	100	19	360	-	410	330	270	<1	0.2	<10	0.12	-	<0.05	0.64	0.87	-	-	<0.05
No. 4	08/01/91	NA	2,300	1,400	8.1	-	10.2	89	17	400	-	480	330	270	<1	0.2	-	-	-	-	0.77	0.69	-	-	-
No. 4	12/12/91	NA	2,300	1,400	-	-	-	-	-	-	-	410	330	-	-	-	-	-	-	-	-	-	-	-	
No. 4	07/02/92	NA	2,500	1,600	-	-	-	-	-	-	-	480	330	-	-	-	-	-	-	-	-	-	-	-	
No. 4	09/02/93	NA	2,300	1,400	7.9	-	10.8	91	15	420	-	440	400	250	<1	0.3	<50	<0.1	-	<0.05	0.73	0.76	-	-	<0.05
No. 4	02/22/94	NA	2,400	1,600	7.9	-	7.8	130	30	380	-	510	330	320	<2	0.2	<50	<0.1	-	0.38	0.57	1.0	-	-	0.27
No. 4	03/30/95	NA	-	-	-	-	7.1	120	34	340	-	470	330	320	-	-	-	-	-	0.35	0.84	1.1	-	-	0.09
No. 4	07/06/95	NA	2,700	1,700	7.8	-	11.5	98	18	470	-	440	420	250	<2	0.4	3	<0.1	-	0.49	0.61	0.75	-	-	<0.05
No. 4	10/05/95	NA	2,500	1,500	8.0	-	11.6	86	14	440	-	450	380	260	<2	0.1	3	<0.1	-	0.38	1.80	0.65	-	-	<0.05

**Table C-3**  
**Summary of Ground-Water Quality Laboratory Results: City of Mendota Wells**

Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (µg/L)	Se <sup>4</sup> (µg/L)	Zn (mg/L)
No. 4	11/02/95	NA	2,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.49	0.62	-	-	-	
No. 4	01/04/96	NA	1,900	1,500	7.6	-	12.5	80	14	460	-	480	390	250	<2	0.6	3	<0.1	-	<0.05	0.52	0.61	-	-	<0.05
No. 4	08/07/97	NA	2,600	1,100	-	-	-	-	-	-	-	590	370	-	-	-	-	-	-	-	0.67	0.91	-	-	-
No. 4	11/06/97	NA	2,600	1,600	-	-	-	-	-	-	-	500	370	-	-	-	-	-	-	-	0.54	0.63	-	-	-
No. 4	01/08/98	NA	2,500	1,700	8.1	-	12.0	98	17	490	-	560	410	220	5.0	<0.1	<50	<0.1	-	<0.05	0.52	0.66	-	-	<0.05
No. 4	05/07/98	NA	-	-	-	-	-	-	-	-	-	480	390	-	-	-	-	-	-	-	0.51	0.64	-	-	-
No. 4	06/04/98	NA	2,700	1,700	-	-	-	-	-	-	-	510	400	-	-	-	-	-	-	-	0.52	0.66	-	-	-
No. 4	08/06/99	FGL	2,450	1,650	7.7	-	8.2	120	32	390	5	590	290	320	<0.4	-	<2	-	1.3	-	0.6	1.0	-	-	-
No. 4	09/29/99	FGL	2,600	1,710	7.6	-	8.4	118	27	390	6	650	320	320	<0.4	-	<2	-	1.5	-	0.8	1.0	-	-	-
No. 4	05/04/01	NA	1,900	1,600	7.6	-	8.8	120	27	410	-	580	300	260	<25	<2.5	3	<0.1	-	<0.05	0.95	1.1	-	-	<0.05
No. 4	06/27/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
No. 4	06/27/01	FGL	2,890	1,790	7.8	220	12.4	88	17	484	6	592	415	270	<0.4	0.2	<2	-	1.3	<0.01	0.56	0.72	8	-	<0.02
No. 4	05/13/02	NA	2,700	1,800	7.7	-	8.7	130	28	420	-	-	-	230	<40	-	-	-	-	<0.05	-	-	-	-	<0.05
No. 4	09/02/02	NA	2,940	1,900	-	-	-	-	-	-	-	851	500	-	-	-	-	-	-	-	0.45	0.75	-	-	-
No. 4	01/07/03	NA	2,570	1,574	-	-	-	-	-	-	-	606	282	-	-	-	-	-	-	-	<0.1	0.46	-	-	-
No. 5	09/15/94	SAL	1,600	1,100	7.9	140	15.2	36	7.1	380	3.6	380	200	140	<0.1	<0.1	<2	<0.1	-	<0.01	.51	0.44	-	-	0.02
No. 5	01/19/96	NA	710	400	8.1	-	10.3	11	3	150	-	84	80	160	4	0.2	<2	<0.1	-	<0.05	0.37	0.18	-	-	<0.05
No. 5	10/09/96	NA	1,300	800	7.8	-	12.7	23	4	250	-	240	150	150	<2	<0.1	<2	<0.1	-	<0.05	0.41	0.23	-	-	<0.05
No. 5	04/03/97	NA	1,100	640	8.3	-	12.3	19	3.3	220	-	190	160	160	5	<0.1	<2	<0.1	-	<0.05	0.26	0.17	-	-	<0.05
No. 5	05/01/97	NA	1,200	710	-	-	-	-	-	-	-	210	130	-	-	-	-	-	-	-	0.29	0.19	-	-	-
No. 5	06/05/97	NA	1,400	850	-	-	-	-	-	-	-	300	150	-	-	-	-	-	-	-	0.46	0.30	-	-	-
No. 5	07/03/97	NA	1,400	850	8.2	-	12.3	29	4.5	270	-	280	160	150	<2	<0.1	<2	<0.1	-	<0.05	0.38	0.25	-	-	<0.05
No. 5	08/07/97	NA	1,700	1,100	-	-	-	-	-	-	-	380	190	-	-	-	-	-	-	-	0.46	0.33	-	-	-
No. 5	10/02/97	BSK	1,600	970	8.0	-	12.6	40	5.3	320	5	340	180	150	<2	0.3	<2	<0.1	-	<0.05	0.43	0.3	-	-	<0.05
No. 5	11/06/97	NA	1,400	870	-	-	-	-	-	-	-	270	150	-	-	-	-	-	-	-	0.59	0.28	-	-	-
No. 5	05/07/98	NA	-	-	-	-	-	-	-	-	-	340	180	-	-	-	-	-	-	-	0.38	0.28	-	-	-
No. 5	06/04/98	NA	1,500	950	-	-	-	-	-	-	-	320	170	-	-	-	-	-	-	-	0.33	0.26	-	-	-
No. 5	09/03/98	NA	1,800	1,100	-	-	-	-	-	-	-	470	230	-	-	-	-	-	-	-	0.45	0.35	-	-	-
No. 5	10/01/98	NA	1,700	1,100	8.1	-	11.7	47	5.9	320	-	400	200	150	<2	<0.1	<2	<0.1	-	<0.05	0.37	0.30	-	-	<0.05
No. 5	12/03/98	NA	1,600	1,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	0.29	-	-	-
No. 5	04/01/99	NA	1,700	1,200	8.0	-	11.7	53	6.4	340	-	410	210	150	<2	<0.1	<2	<0.1	-	<0.05	0.40	0.33	-	-	<0.05
No. 5	07/01/99	NA	1,800	1,200	7.8	-	11.7	57	6.9	350	-	320	160	150	<2	<0.1	<2	<0.1	-	<0.05	0.33	0.33	-	-	<0.05
No. 5	08/06/99	FGL	2,150	1,420	7.5	-	11.5	70	8	380	5	559	246	200	<0.4	-	<2	-	1.1	-	0.4	0.4	-	-	-
No. 5	09/29/99	FGL	1,950	1,260	7.9	-	10.1	63	8	320	5	479	217	210	<0.4	-	<2	-	1.0	-	0.4	0.4	-	-	-
No. 5	11/04/99	NA	1,800	1,100	-	-	-	-	-	-	-	430	200	-	-	-	-	-	-	-	0.34	0.32	-	-	-
No. 5	05/04/00	NA	1,800	1,200	-	-	-	-	-	-	-	390	190	-	-	-	-	-	-	-	0.44	0.34	-	-	-
No. 5	06/01/00	BSK	1,800	1,200	-	-	-	-	-	-	-	280	130	-	-	-	-	-	-	-	0.35	0.34	-	-	-
No. 5	05/04/01	NA	1,800	1,300	7.9	-	10.4	80	9.7	370	-	520	220	140	-	-	<2	<0.1	-	<0.05	0.44	0.46	-	-	<0.05
No. 5	10/02/01	OBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.90	<0.4	-	
No. 5	10/02/01	FGL	2,180	1,400	7.9	170	11.5	75	11	403	5	587	235	210	<0.4	0.2	<2	-	1.21	<0.01	0.42	0.47	-	-	<0.02
No. 5	05/13/02	NA	2,100	1,400	7.7	-	9.8	80	10	350	-	-	170	<30	-	-	-	-	-	<0.05	-	-	-	-	<0.05
No. 5	09/02/02	NA	2,370	1,420	-	-	-	-	-	-	-	766	468	-	-	-	-	-	-	-	0.05	0.34	-	-	-
No. 5	01/07/03	NA	2,570	1,596	-	-	-	-	-	-	-	280	611	-	-	-	-	-	-	-	<0.1	0.23	-	-	-

**Table C-3**  
**Summary of Ground-Water Quality Laboratory Results: City of Mendota Wells**

Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (µmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (µg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (µg/L)	Zn (µg/L)
No. 6	01/23/96	NA	630	350	7.4	-	2.2	39	17	66	-	63	83	160	<2	0.1	<2	0.21	-	<0.05	7.7	1.6	-	-	0.055
No. 7	06/12/01	NA	732	468	8.3	133	27.4	2.9	0.3	184	2.0	86	88	162	<0.2	0.7	5.8	0.01	0.61	0.01	0.28	0.03	-	-	0.030
No. 8	06/12/01	NA	564	401	8.5	117	17.2	3.1	0.67	128	2.1	68	77	135	<0.2	0.6	3.5	0.01	0.46	0.01	0.41	0.03	-	-	0.215
No. 9	08/27/01	NA	598	420	8.3	126	22.7	2.1	0.25	130	1.9	67	78	149	<0.2	0.7	2.7	0.01	0.48	0.01	0.32	0.03	-	-	<0.025

1. Laboratory Abbreviations: TL - The Twining Laboratories, Inc.; BSK - BSK Analytical Laboratories, Fresno; BCL - BC Laboratories, Bakersfield; FGL - Fruit Growers Laboratory, Santa Paula; OBL - Analyses by Olson Biochemistry Laboratories of South Dakota State University, Brookings, SD (Se and Mo Only); SAL - Sequoia Analytical Laboratories, Fresno.

2. Electrical Conductivity at 25°C

3. HCO<sub>3</sub>, total alkalinity and NO<sub>3</sub> reported as HCO<sub>3</sub>, CaCO<sub>3</sub> and NO<sub>3</sub>, respectively.

4. Only selenium results analysed with a detection limit ≤0.5 µg/L are reported.

NA - Not available

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>					Cations				Anions				Trace Elements										
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
<b>Shallow Wells</b>																									
MW-1	11/1982	BCL	1,480	890	9.2	-	52.0	2.5	0.51	345	2	93	206	390	<0.4	0.84	<10	-	0.44	-	0.06	0.02	-	-	-
MW-1	05/05/83	BCL	1,400	973	8.6	-	52.4	2.9	0.6	375	1.2	120	203	428	<0.1	-	<10	-	-	-	0.05	0.03	-	-	-
MW-1	05/22/84	BCL	1,780	1,083	8.8	-	50.2	3	1.1	400	0.9	145	230	424	<0.4	-	-	-	-	-	0.08	0.04	-	-	-
MW-1	04/21/87	BCL	1,530	935	7.8	-	47.9	2.4	1	350	0.7	101	192	473	0.4	-	-	<0.1	-	-	0.06	0.03	-	-	-
MW-1	03/28/88	BCL	1,280	830	8.9	-	45.7	1.9	0.9	305	0.7	85	153	345	<0.4	-	-	<0.1	-	-	<0.05	0.01	-	-	-
MW-1	12/22/88	BCL	1,330	925	8.8	-	49.0	2	1	340	1	136	230	282	<0.4	-	-	-	-	-	<0.05	0.01	-	-	-
MW-1	04/11/90	BCL	1,510	940	8.9	-	43.5	2.6	1.4	350	5	134	257	291	<0.4	-	5	<0.1	-	-	<0.05	0.021	-	-	-
MW-1	06/10/91	BCL	2,400	1,320	8.8	-	-	-	-	0.8	-	384	406	-	-	-	<0.1	-	-	-	-	-	-	-	-
MW-1	02/24/92	BCL	2,700	1,570	8.6	-	54.0	4.8	2.3	575	0.5	384	267	632	<0.4	0.66	-	<0.1	0.56	-	<0.05	0.024	-	-	-
MW-1	10/19/92	BCL	3,600	2,110	8.5	-	58.0	8	4	805	1.7	355	380	948	3.1	0.64	-	<0.1	0.63	-	<0.05	0.036	-	-	-
MW-1	03/03/93	BCL	3,900	2,270	8.5	-	60.4	8.7	5.2	912	2	310	344	1,230	<0.4	0.55	-	<0.1	0.8	-	0.059	0.046	-	-	-
MW-1	03/08/94	BCL	4,050	2,580	8.4	-	68.8	7.6	5.1	999	2.1	450	444	1,270	<0.4	0.74	-	0.20	0.45	-	4.15	2.32	-	-	-
MW-1	09/19/94	BCL	4,050	2,630	8.4	-	59.3	10.5	5.4	948	2.6	505	438	1,090	1.3	0.38	-	<0.1	0.86	-	<0.05	0.046	-	-	-
MW-1	03/15/95	BCL	4,000	2,580	8.4	-	66.9	8.5	4.9	989	2.7	489	493	1,100	5.8	0.44	-	<0.1	0.86	-	<0.05	0.021	-	-	-
MW-1	04/02/96	BCL	4,300	2,590	8.4	-	56.1	11.5	7.4	992	2.6	440	520	1,280	<0.4	0.6	-	<0.1	1.0	-	<0.05	0.085	-	-	-
MW-1	09/30/96	BCL	3,660	2,300	9.0	-	59.4	8.2	5.6	901	2.2	336	445	1,070	8.9	0.54	-	<0.1	1.0	-	<0.05	0.067	-	-	-
MW-1	06/02/97	BCL	2,340	1,440	8.6	-	54.4	3.8	2.4	550	1.4	186	241	665	<0.4	0.59	-	<0.1	0.84	-	<0.05	0.037	-	-	-
MW-1	03/18/98	BSK	3,600	2,200	8.3	1,100	59.5	9	4.6	880	1.8	<50	410	1,342	<25	<2.5	31	0.06	1.3	-	<0.05	0.07	-	-	-
MW-1	08/25/98	BSK	3,300	2,000	8.4	960	57.3	7.8	3.8	780	2.4	210	390	1,171	<2	<1	-	<0.05	1.2	-	<0.05	0.06	-	-	-
MW-1	04/20/99	BSK	2,800	1,800	8.4	780	58.4	6.1	3.1	710	2	370	490	952	<6	<3	-	<0.05	1.0	-	<0.05	0.04	-	-	-
MW-1	11/14/99	BSK	3,800	2,400	8.2	1,400	55.8	10	5.1	870	2	190	430	1,708	<10	<5	-	0.05	1.2	-	<0.05	0.08	-	-	-
MW-1	05/21/00	BSK	3,400	2,200	8.2	1,100	60.3	8.9	4.4	880	<2	210	400	1,342	<8	<4	-	0.05	1.2	-	<0.05	0.07	-	-	-
MW-1	12/19/00	BSK	3,900	2,500	8.2	1,300	60.7	7.6	4	830	2	220	440	1,586	<10	<5	-	<0.05	1.2	-	<0.05	0.06	-	-	-
MW-1	06/05/01	BSK	3,800	2,600	8.1	1,400	67.7	8.3	5	1,000	2	200	490	1,708	-	<5	-	<0.05	1.3	-	<0.05	0.08	-	-	-
MW-1	05/02/02	BSK	4,100	2,400	8.2	1,500	-	7.4	4.4	980	2	180	500	1,500	<12	<6	-	0.06	1.2	-	<0.05	0.08	-	-	-
MW-1	09/17/02	TL	4,400	2,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-1	01/13/03	TL	4,000	2,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-2	12/22/88	BCL	1,770	1,005	7.6	-	7.2	61	43	300	3	12	168	880	0.9	-	-	0.1	-	-	<0.05	1.3	-	-	-
MW-2	04/20/99	BSK	2,200	1,300	7.3	930	8.2	110	44	400	8	<50	220	1,135	<5	<2.5	-	0.18	0.4	-	<0.05	2.6	-	-	-
MW-2	05/21/00	BSK	2,100	1,400	7.3	940	7.9	99	36	360	7	<50	220	1,147	<5	<2.5	-	0.17	0.4	-	<0.05	2.6	-	-	-
MW-2	12/19/00	BSK	2,200	1,300	7.3	980	8.7	85	32	370	7	<50	200	1,196	<5	<2.5	-	0.15	0.4	-	<0.05	2.2	-	-	-
MW-2	06/05/01	BSK	2,200	1,400	7.0	1,000	8.3	100	41	390	9	<60	250	1,220	-	<3	-	0.18	0.4	-	<0.05	3.5	-	-	-
MW-2	05/02/02	BSK	2,300	1,400	7.6	950	-	94	35	350	6	<70	220	950	<7	<3.5	-	0.18	0.4	-	<0.05	2.7	-	-	-
MW-2	09/17/02	TL	2,400	1,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-2	01/13/03	TL	2,500	1,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-3	12/22/88	BCL	1,325	735	7.3	-	5.5	51	17	176	14	15	150	533	<0.4	-	-	-	-	-	<0.05	0.3	-	-	-
MW-3	04/20/99	BSK	2,300	1,400	7.1	-	9.8	98	30	430	22	<50	200	970	<0.2	-	-	0.4	-	0.14	1.3	-	-	-	
MW-3	11/1999	BSK	2,500	1,500	7.8	-	6.9	150	42	370	26	75	260	950	<0.2	-	-	0.4	-	0.3	2.2	-	-	-	

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>					Cations				Anions				Trace Elements										
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
MW-3	05/21/00	BSK	2,300	1,400	7.3	1,100	8.1	110	34	380	23	<50	240	1,342	<5	<2.5	-	0.12	0.4	-	<0.05	1.6	-	-	-
MW-3	12/19/00	BSK	2,500	1,400	7.1	1,000	7.7	110	35	360	24	<60	240	-	<6	<3	-	0.12	0.4	-	<0.05	1.4	-	-	-
MW-3	06/05/01	BSK	2,400	1,500	6.8	995	7.4	130	43	380	25	<60	280	1,214	-	<3	-	0.13	0.4	-	<0.05	1.8	-	-	-
MW-3	03/27/02	FGL	2,510	1,480	6.9	1,030	7.9	108	33	365	21	1	230	1,260	<0.4	0.4	60	0.21	0.47	<0.01	17.9	1.79	-	-	<0.02
MW-3	04/23/02	TL	2,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-3	05/02/02	BSK	2,600	1,400	7.3	1,000	-	120	37	360	21	<80	270	1,000	<8	<4	-	0.14	0.5	-	<0.05	1.7	-	-	-
MW-3	09/17/02	TL	2,700	1,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-3	01/13/03	TL	2,800	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-4	04/22/99	BSK	1,700	1,000	8.0	390	12.0	33	19	350	8	77	240	476	<4	<2	-	0.09	0.3	-	0.05	1.1	-	-	-
MW-4	05/21/00	BSK	1,700	1,100	6.9	450	11.7	36	19	350	7	59	290	549	<4	<2	-	0.08	0.2	-	<0.05	0.96	-	-	-
MW-4	12/17/00	BSK	1,700	998	7.3	430	9.8	34	17	280	6	50	280	525	<4	<2	-	0.07	0.2	-	<0.05	0.66	-	-	-
MW-4	06/05/01	BSK	1,900	1,200	6.8	500	12.0	41	24	390	8	84	340	610	-	<2	-	0.1	0.2	-	<0.05	0.78	-	-	-
MW-4	05/02/02	BSK	2,200	1,200	7.5	560	-	39	24	410	7	82	340	560	6.6	<3.2	-	0.1	0.2	-	<0.05	0.44	-	-	-
MW-5	12/22/88	BCL	860	525	7.9	-	2.6	49	30	94	4	86	118	243	3.0	-	-	<0.1	-	-	<0.05	0.04	-	-	-
MW-5	04/22/99	BSK	1,700	1,000	7.7	440	7.1	72	34	290	6	67	260	537	<4	<2	-	0.09	0.2	-	<0.05	0.09	-	-	-
MW-5	05/21/00	BSK	1,600	1,000	7.2	470	7.3	61	31	280	5	67	290	573	6.4	<2	-	0.10	0.2	-	<0.05	0.41	-	-	-
MW-5	12/17/00	BSK	1,700	996	7.2	440	7.2	61	32	280	5	50	280	537	<4	<2	-	0.11	0.2	-	<0.05	0.56	-	-	-
MW-5	06/05/01	BSK	1,700	1,000	6.8	450	7.2	66	34	290	6	55	320	549	-	<2	-	0.11	0.2	-	<0.05	0.56	-	-	-
MW-5	05/02/02	BSK	1,800	940	7.4	450	-	60	32	270	5	<60	270	450	<6	<3	-	0.12	0.2	-	<0.05	0.65	-	-	-
MW-6	12/22/88	BCL	1,390	895	7.3	-	2.7	102	41	129	7	177	210	263	10.0	-	-	<0.1	-	-	<0.05	0.55	-	-	-
MW-6	04/21/99	BSK	1,700	1,100	7.0	250	3.1	130	58	170	9	220	280	305	<4	<2	-	0.06	0.1	-	0.05	2.7	-	-	-
MW-6	05/21/00	BSK	1,400	900	6.6	240	3.2	88	48	150	8	190	220	293	<3	<1.5	-	<0.05	0.1	-	1.4	1.6	-	-	-
MW-6	12/17/00	BSK	1,400	880	6.4	230	3.0	90	44	140	7	190	210	281	<4	<2	-	0.05	0.1	-	0.75	1.6	-	-	-
MW-6	06/05/01	BSK	1,300	830	6.8	240	3.2	90	45	150	8	200	210	293	-	<1.5	-	0.05	0.2	-	0.43	1.8	-	-	-
MW-6	05/02/02	BSK	1,300	900	6.8	240	-	74	37	130	6	170	180	240	<4	<2	-	<0.05	0.2	-	1.3	1.4	-	-	-
MW-9	04/21/99	BSK	990	610	6.9	270	1.8	88	41	80	7	76	140	329	<2	<1	-	0.13	<0.1	-	2.7	2.4	-	-	-
MW-9	05/20/00	BSK	960	660	6.6	200	1.3	89	41	60	7	170	99	244	<2	<1	-	0.09	<0.1	-	4.9	2.4	-	-	-
MW-9	12/17/00	BSK	930	600	6.4	200	1.2	86	39	53	6	170	78	244	<2	<1	-	0.08	<0.1	-	1.1	1.8	-	-	-
MW-9	06/05/01	BSK	840	580	6.4	170	1.1	86	38	50	6	190	76	207	-	<1	-	0.07	<0.1	-	0.97	2.1	-	-	-
MW-9	05/02/02	BSK	930	600	6.6	170	-	82	35	44	5	180	72	170	<3.2	<1.6	-	0.09	<0.1	-	4.6	1.6	-	-	-
MW-13	09/22/93	BCL	2,400	1,240	7.3	-	9.7	69	26	371	6.1	65	300	-	-	-	-	-	-	-	-	-	-	-	
MW-13	04/21/99	BSK	3,000	1,800	7.5	1,000	9.8	130	60	540	9	62	390	1,220	<6	<3	-	0.41	0.2	-	<0.05	4	-	-	-
MW-13	05/20/00	BSK	2,500	1,600	7.0	870	9.1	94	42	420	8	75	370	1,061	6.3	<3	-	0.24	0.3	-	0.07	2.4	-	-	-
MW-13	12/17/00	BSK	2,400	1,500	7.3	760	8.6	84	38	380	7	70	370	927	<5	<2.5	-	0.22	0.3	-	<0.05	2.2	-	-	-
MW-13	06/05/01	BSK	2,200	1,700	7.3	560	7.8	87	40	350	8	100	380	683	<5	<2.5	-	0.18	0.2	-	<0.05	2.6	-	-	-
MW-13	05/02/02	BSK	2,400	1,400	7.6	600	-	81	38	360	6	100	380	600	<8	<4	-	0.18	0.2	-	<0.05	2.1	-	-	-
MW-15	12/07/88	BCL	21,600	13,300	7.9	-	120.8	11	10	2,300	3,860	118	1894	11,520	1.0	0.6	20	1.5	0.2	-	1.3	0.03	-	-	-

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>					Cations				Anions				Trace Elements										
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
MW-15	04/22/99	BSK	5,500	2,800	7.6	2,300	22.8	9.5	23	570	670	<200	350	2,806	<20	<10	-	0.41	0.4	-	0.48	0.03	-	-	-
MW-15	05/21/00	BSK	5,500	2,900	7.5	2,400	21.4	8.5	17	470	650	<120	390	2,440	<12	<6	-	0.47	0.4	-	1.1	0.03	-	-	-
MW-15	12/17/00	BSK	5,500	2,800	7.6	2,500	21.8	8.7	19	500	680	<120	380	3,050	<12	<6	-	0.39	0.4	-	0.49	0.04	-	-	-
MW-15	06/06/01	BSK	6,400	3,500	7.6	2,600	26.4	12	18	620	880	<200	560	3,172	-	<10	-	0.44	0.4	-	1.8	0.03	-	-	-
MW-15	05/02/02	BSK	6,600	3,500	7.8	2,700	-	7.3	19	510	640	<20	59	2,700	2.4	<1	-	0.5	0.3	-	0.72	0.02	-	-	-
MW-17	12/08/88	BCL	5,000	2,534	7.5	-	9.7	53	62	440	512	50	241	2,694	4.0	0.2	20	0.5	0.3	-	0.18	0.17	-	-	-
MW-17	04/22/99	BSK	3,600	2,200	7.0	2,000	4.8	220	150	380	130	<100	250	2,440	<10	<5	-	0.18	0.3	-	0.08	0.4	-	-	-
MW-17	05/21/00	BSK	3,700	2,100	7.2	1,800	5.0	190	110	350	140	88	280	2,196	<8	<4	-	0.23	0.3	-	0.1	0.31	-	-	-
MW-17	12/17/00	BSK	3,800	2,000	7.1	1,800	4.9	180	110	340	150	80	290	2,196	<8	<4	-	0.26	0.4	-	0.75	0.28	-	-	-
MW-17	06/06/01	BSK	3,600	2,100	6.9	1,800	5.4	190	110	380	170	<100	290	2,196	-	<5	-	0.2	0.4	-	<0.05	0.29	-	-	-
MW-17	05/02/02	BSK	3,600	440	7.2	1,400	-	150	83	300	110	190	340	1,400	<16	<8	-	0.16	0.3	-	0.06	0.24	-	-	-
MW-18	12/09/88	BCL	4,700	2,490	7.8	-	22.2	19	20	580	387	92	460	1,964	1	0.1	<10	0.40	0.3	-	1.4	0.13	-	-	-
MW-18	04/20/99	BSK	7,900	4,600	7.4	3,200	30.9	44	82	1,500	510	<200	860	3,904	<20	<10	-	1.10	0.4	-	0.6	0.34	-	-	-
MW-18	05/21/00	BSK	6,700	4,000	7.5	3,200	21.6	54	54	940	600	<150	630	3,904	<15	<7.5	-	1.40	0.4	-	0.54	0.27	-	-	-
MW-18	12/19/00	BSK	7,200	3,800	7.4	3,000	18.6	52	54	800	550	<200	720	3,660	<20	<10	-	1.30	0.4	-	0.44	0.26	-	-	-
MW-18	06/06/01	BSK	6,800	3,700	7.4	2,800	21.9	44	46	870	580	<200	780	3,360	-	<10	-	1.20	0.4	-	0.58	0.24	-	-	-
MW-18	05/02/02	BSK	7,200	4,100	7.8	2,700	-	36	48	1100	380	<240	870	2,700	<24	<12	-	1	0.4	-	0.4	0.19	-	-	-
MW-18	09/19/02	TL	2,700	1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-18	01/13/03	TL	7,500	4,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-19	12/09/88	BCL	16,500	9,840	8.0	-	53.9	24	24	1,560	2,800	77	1,420	8,922	<1	0.3	10	2.5	0.2	-	1.2	0.11	-	-	-
MW-19	04/21/99	BSK	4,700	2,500	7.9	2,000	24.3	7.7	14	490	540	<100	260	2,440	<10	<5	-	0.32	0.4	-	0.65	0.16	-	-	-
MW-19	05/21/00	BSK	4,100	2,200	7.6	2,100	23.0	6.4	10	400	470	<100	240	2,100	<10	<5	-	0.28	0.5	-	0.93	0.15	-	-	-
MW-19	12/17/00	BSK	4,300	2,200	7.5	1,800	23.1	7.4	13	450	480	<100	270	2,196	<10	<5	-	0.28	0.4	-	0.45	0.13	-	-	-
MW-19	06/06/01	BSK	4,200	2,100	7.5	1,800	21.7	8.3	13	430	490	<100	300	2,196	-	<5	-	0.29	0.5	-	0.9	0.14	-	-	-
MW-19	05/02/02	BSK	4,400	2,200	7.8	1,700	-	7.4	13	400	420	<120	300	1,700	<12	<6	-	0.28	0.4	-	0.7	0.11	-	-	-
MW-20	04/21/99	BSK	2,000	1,300	7.5	670	11.7	57	25	420	10	190	190	817	<4	<2	-	0.15	0.4	-	<0.05	1.0	-	-	-
MW-20	12/19/00	BSK	2,200	1,400	7.5	600	11.4	56	26	410	10	310	200	732	<5	<2.5	-	0.13	0.4	-	<0.05	0.89	-	-	-
MW-20	06/06/01	BSK	2,100	1,400	7.3	580	10.0	64	28	380	11	300	220	708	-	<2.5	-	0.11	0.4	-	<0.05	1.0	-	-	-
MW-20	05/02/02	BSK	2,400	1,500	7.6	540	-	60	27	380	9	320	250	540	<6	<3	-	0.11	0.4	-	<0.05	1	-	-	-
MW-21	04/22/99	BSK	2,400	1,400	7.2	730	12.6	51	25	440	78	200	230	891	<6	<3	-	0.17	0.4	-	<0.05	0.4	-	-	-
MW-21	05/21/00	BSK	2,200	1,500	7.3	680	11.5	52	24	400	80	250	250	830	<5	<2.5	-	0.12	0.4	-	<0.05	0.5	-	-	-
MW-21	12/19/00	BSK	2,300	1,400	7.4	640	12.1	44	21	390	63	200	240	781	<5	<2.5	-	0.13	0.3	-	<0.05	0.4	-	-	-
MW-21	06/04/01	BSK	2,100	1,300	7.3	580	10.5	51	23	360	60	210	250	708	<4	<2	-	0.11	0.3	-	<0.05	0.5	-	-	-
MW-21	05/02/02	BSK	7,200	3,900	7.9	2,600	-	23	15	580	740	72	620	2,600	<6	<3	-	0.12	0.3	-	0.22	0.27	-	-	-
MW-23	04/22/99	BSK	4,900	2,700	7.3	1,900	16.0	53	35	610	450	140	400	2,318	<5	<5	-	0.85	0.38	-	0.15	0.42	-	-	-
MW-23	05/21/00	BSK	4,100	2,500	7.2	1,700	16.8	30	24	510	390	140	360	2,074	<10	<5	-	0.49	0.4	-	0.07	0.42	-	-	-
MW-23	12/19/00	BSK	4,900	2,500	7.4	1,700	13.5	51	30	490	360	200	400	2,074	<10	<5	-	0.60	0.4	-	0.21	0.43	-	-	-

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>						Cations				Anions				Trace Elements									
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
MW-23	06/04/01	BSK	4,400	2,400	7.4	1,600	18.6	30	22	550	380	180	390	1,952	<8	<4	-	0.46	0.4	-	0.2	0.36	-	-	-
MW-23	05/02/02	BSK	3,800	2,400	7.7	1,200	-	41	23	450	230	240	340	1,200	<10	<5	-	0.28	0.4	-	0.07	0.42	-	-	-
MW-24	04/22/99	BSK	2,700	2,000	6.4	220	4.0	210	100	280	18	650	440	268	<10	<5	-	0.07	0.2	-	0.22	7.1	-	-	-
MW-24	05/21/00	BSK	2,300	1,600	6.2	150	3.8	140	81	230	13	490	440	183	<5	<2.5	-	<0.05	0.2	-	1.6	4.8	-	-	-
MW-24	12/17/00	BSK	2,600	1,800	6.3	200	3.3	200	98	230	14	690	440	244	<6	<3	-	<0.05	0.1	-	2.6	4.1	-	-	-
MW-24	06/05/01	BSK	2,400	1,700	6.7	220	3.3	200	97	230	14	600	460	268	-	<3	-	<0.05	0.2	-	1.0	3.9	-	-	-
MW-24	05/02/02	BSK	2,600	1,900	6.7	190	-	180	86	210	13	590	430	190	<8	<4	-	<0.05	0.1	-	2.7	3.4	-	-	-
MW-25	04/21/99	BSK	2,800	1,800	7.9	700	22.6	29	16	610	3	280	350	854	<6	<3	-	0.09	0.5	-	<0.05	0.6	-	-	-
MW-25	05/21/00	BSK	2,300	1,600	7.6	760	21.7	24	13	530	2	160	300	927	<5	<2.5	-	0.08	0.5	-	0.14	0.55	-	-	-
MW-25	12/19/00	BSK	2,600	1,600	7.6	750	22.6	22	13	540	3	150	320	915	<6	<3	-	0.07	0.5	-	0.05	0.44	-	-	-
MW-25	06/06/01	BSK	2,400	1,500	7.7	800	21.5	23	13	520	3	160	330	976	-	<3	-	0.07	0.5	-	0.1	0.47	-	-	-
MW-25	05/02/02	BSK	2,500	1,400	7.1	1,000	-	20	12	530	2	200	310	1,000	<8	<4	-	0.07	0.6	-	0.11	0.4	-	-	-
MW-26	04/22/99	BSK	9,300	5,200	7.6	3,200	45.4	12	15	1,000	1,300	<200	790	3,904	<20	<10	-	1.1	0.4	-	1.0	0.03	-	-	-
MW-26	05/21/00	BSK	2,500	1,500	7.7	1,100	12.5	41	22	400	120	79	270	1,342	<5	<2.5	-	2.30	0.3	-	0.46	0.28	-	-	-
MW-26	12/17/00	BSK	7,800	4,100	7.7	3,400	31.2	13	18	740	1,000	<200	660	4,148	<20	<10	-	0.91	0.3	-	1.3	0.04	-	-	-
MW-26	06/04/01	BSK	4,900	2,000	7.5	1,900	15.0	37	35	530	510	180	420	2,318	<12	<6	-	1.30	0.3	-	2.0	0.12	-	-	-
MW-26	05/02/02	BSK	7,700	4,300	7.9	2,400	-	9.2	11	600	850	<240	600	2,400	<24	<12	-	0.73	0.3	-	1	0.02	-	-	-
MW-27	04/21/99	BSK	9,500	5,200	7.9	3,700	33.7	29	23	1,000	1,600	210	850	4,514	<20	<10	-	1.80	0.3	-	1.1	0.12	-	-	-
MW-27	05/21/00	BSK	7,500	4,500	7.4	3,500	21.8	44	34	790	1,000	220	750	4,270	<20	<10	-	1.40	0.3	-	1.3	0.16	-	-	-
MW-27	12/17/00	BSK	7,600	4,200	7.5	3,200	21.7	42	34	780	940	<200	730	3,904	<20	<10	-	1.40	0.3	-	0.8	0.19	-	-	-
MW-27	06/06/01	BSK	7,100	4,100	7.4	3,000	20.8	45	34	760	930	<200	720	3,660	-	<10	-	1.30	0.3	-	1.2	0.21	-	-	-
MW-27	05/02/02	BSK	7,400	4,700	7.8	3,100	-	30	27	630	700	<240	680	3,100	<24	<12	-	1.10	0.3	-	0.72	0.11	-	-	-
MW-28	10/10/91	BCL	2,900	1,650	7.6	-	6.9	152	62	397	7	219	270	-	-	-	-	-	-	-	-	-	-	-	-
MW-28	04/22/99	BSK	1,800	1,200	7.3	360	5.4	92	34	240	6	440	150	439	<4	<2	-	0.06	0.3	-	<0.05	1.0	-	-	-
MW-28	05/20/00	BSK	1,800	1,300	7.3	330	5.4	110	38	260	8	450	150	403	4.5	<2	-	0.06	0.3	-	<0.05	1.2	-	-	-
MW-28	12/18/00	BSK	2,100	1,300	7.3	290	3.8	130	46	200	8	560	140	354	<5	<2.5	-	<0.05	0.2	-	<0.05	2.4	-	-	-
MW-28	06/05/01	BSK	1,800	1,400	7.3	290	4.8	120	44	240	8	550	140	354	<4	<2	-	<0.05	0.3	-	<0.05	2	-	-	-
MW-28	05/02/02	BSK	2,000	1,500	7.1	240	-	160	51	180	8	680	120	240	<5	<2.5	-	<0.05	0.2	-	<0.05	2.7	-	-	-
MW-29	10/14/91	BCL	1,910	1,345	7.6	-	2.5	196	56	157	6.7	308	227	-	-	-	-	-	-	-	-	-	-	-	-
MW-29	04/22/99	BSK	1,800	1,300	7.1	470	3.2	170	45	180	6	290	210	573	<4	<2	-	0.09	0.2	-	<0.05	1.7	-	-	-
MW-29	05/20/00	BSK	1,700	1,200	6.8	320	2.2	170	51	130	7	340	180	390	<4	<2	-	0.06	0.1	-	2.5	2.2	-	-	-
MW-29	12/18/00	BSK	1,800	1,100	7.4	290	2.2	140	53	120	7	360	170	354	<4	<2	-	0.07	0.1	-	0.46	2.3	-	-	-
MW-29	06/05/01	BSK	1,600	1,200	6.7	270	2.1	150	60	120	7	390	170	329	<4	<2	-	0.07	0.1	-	1.0	2.5	-	-	-
MW-29	05/02/02	BSK	1,600	1,200	6.6	200	-	160	62	88	7	470	140	200	<4	<2	-	0.06	<0.1	-	0.69	2.8	-	-	-
MW-30	10/11/91	BCL	240	160	7.3	-	0.8	18	7.7	15	2.3	34	7.1	-	-	-	-	-	-	-	-	-	-	-	-
MW-30	04/22/99	BSK	500	370	6.4	60	0.5	46	18	17	3	170	13.0	73	<2	<1	-	<0.05	<0.1	-	<0.05	0.05	-	-	-
MW-30	05/20/00	BSK	360	230	6.5	60	-	35	14	16	<2	96	10.0	73	<1	<0.5	-	<0.05	<0.1	-	0.08	0.06	-	-	-

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>	Cations					Anions					Trace Elements												
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
MW-30	12/18/00	BSK	400	240	6.4	60	0.6	32	14	16	2	110	9.0	73	<0.8	<0.4	-	<0.05	<0.1	-	0.08	0.06	-	-	-
MW-30	06/05/01	BSK	340	250	6.2	56	0.6	32	13	15	3	100	8	68	<0.6	<0.3	-	<0.05	<0.1	-	0.09	0.06	-	-	-
MW-30	05/02/02	BSK	450	240	6.4	54	-	40	15	14	2	130	10	54	<0.6	<0.3	-	<0.05	<0.1	-	<0.05	0.07	-	-	-
MW-31	10/14/91	BCL	450	305	7.6	-	1.4	37	11	37	3.5	103	20.2	-	-	-	-	-	-	-	-	-	-	-	-
MW-31	04/22/99	BSK	470	320	6.5	68	1.2	39	14	33	3	140	20.0	83	<1	<0.5	-	<0.05	<0.1	-	<0.05	0.47	-	-	-
MW-31	05/20/00	BSK	820	530	6.4	74	1.2	82	30	48	5	290	39.0	90	<2	<1	-	<0.05	<1.0	-	0.37	0.52	-	-	-
MW-31	12/18/00	BSK	920	600	6.3	74	1.2	77	28	49	5	300	44.0	90	<2	<1	-	<0.05	<0.1	-	0.27	0.53	-	-	-
MW-31	06/06/01	BSK	810	570	7.0	78	1.2	84	30	50	6	300	53	95	-	<1	-	<0.05	<0.1	-	0.16	0.56	-	-	-
MW-31	05/02/02	BSK	850	570	6.4	78	-	73	25	49	4	200	37	78	<2	<1	-	<0.05	<0.1	-	<0.05	0.53	-	-	-
MW-32	10/11/91	BCL	260	200	7.3	-	0.8	26	6.5	17	2.3	50	5	-	-	-	-	-	-	-	-	-	-	-	-
MW-32	04/22/99	BSK	420	310	6.8	54	0.6	48	12	18	3	140	7	66	<0.2	<0.3	-	<0.05	<0.1	-	<0.05	0.12	-	-	-
MW-32	05/20/00	BSK	280	170	6.9	46	0.7	28	6.7	15	2	70	6	56	<0.6	<0.3	-	<0.05	<0.1	-	<0.05	0.09	-	-	-
MW-32	12/18/00	BSK	340	210	7.2	56	0.7	30	7.5	17	2	92	7	68	<0.6	<0.3	-	<0.05	<0.1	-	<0.05	0.13	-	-	-
MW-32	06/05/01	BSK	290	220	6.5	46	0.8	27	7.1	19	3	84	7	56	<0.6	<0.3	-	<0.05	<0.1	-	<0.05	0.1	-	-	-
MW-32	05/02/02	BSK	290	160	6.3	48	-	20	4.9	14	2	50	6	48	<0.4	<0.2	-	<0.05	<0.1	-	<0.05	0.08	-	-	-
<b>Deep Wells</b>																									
MW-7	04/21/99	BSK	7,000	4,400	7.3	2,500	26.8	160	47	1,500	200	<150	1,000	3,050	<0.2	<7.5	-	2.4	0.2	-	1.4	0.86	-	-	-
MW-7	05/21/00	BSK	6,400	4,300	6.8	2,700	11.9	170	43	670	100	<200	1,100	3,294	<20	<10	-	1.6	0.2	-	0.59	0.91	-	-	-
MW-7	12/17/00	BSK	6,400	4,400	6.9	2,400	26.5	150	37	1,400	90	<140	1,000	2,928	<14	<7	-	1.5	0.2	-	0.65	0.6	-	-	-
MW-7	06/05/01	BSK	6,500	4,500	6.6	1,300	23.3	160	46	1,300	82	<200	1,100	1,586	-	<10	-	1.5	0.2	-	0.54	0.74	-	-	-
MW-7	05/02/02	BSK	6,700	4,000	7.1	2,300	-	140	37	1300	80	<220	1,100	2,300	<22	<11	-	1.5	0.2	-	0.76	0.54	-	-	-
MW-8	04/21/99	BSK	1,100	720	8.1	450	15.7	18	2.7	270	2	<30	120	549	<3	<1.5	-	0.06	<0.1	-	<0.05	0.11	-	-	-
MW-8	05/20/00	BSK	1,200	760	7.9	480	13.5	21	3.1	250	<2	<30	140	586	<3	<1.5	-	0.06	<0.1	-	<0.05	0.14	-	-	-
MW-8	12/17/00	BSK	1,300	830	7.8	490	13.9	24	4	280	2	<32	150	598	<3.2	<1.6	-	0.07	<0.1	-	<0.05	0.16	-	-	-
MW-8	06/05/01	BSK	1,300	810	7.8	490	14.2	25	3.9	290	2	<30	160	598	-	<1.5	-	0.07	<0.1	-	<0.05	0.17	-	-	-
MW-8	05/02/02	BSK	1,400	790	8.0	500	-	22	3.6	280	<2	<40	160	500	<4	<2	-	0.07	<0.1	-	<0.05	0.15	-	-	-
MW-10	04/20/99	BSK	1,200	700	7.8	490	12.5	31	4.2	280	2	<30	120	598	<3	<1.5	-	0.06	0.1	-	<0.05	0.35	-	-	-
MW-10	05/21/00	BSK	1,200	730	7.8	470	12.6	25	2.9	250	2	<30	130	573	3.3	<1.5	-	<0.05	<0.1	-	0.1	0.25	-	-	-
MW-10	12/19/00	BSK	1,200	760	7.9	480	14.5	19	2.2	250	<2	<30	120	586	<3	<1.5	-	<0.05	<0.1	-	0.08	0.15	-	-	-
MW-10	06/05/01	BSK	1,200	740	7.8	470	13.1	25	2.9	260	<2	<30	130	573	-	<1.5	-	<0.05	<0.1	-	<0.05	0.22	-	-	-
MW-10	05/02/02	BSK	1,300	800	8.0	500	-	20	2.4	280	2	<40	130	500	<4	<2	-	0.05	0.1	-	0.06	0.15	-	-	-
MW-11	12/01/88	BCL	1,460	940	8.3	-	36.8	6	1	370	1	6	113	797	<0.4	-	-	-	-	-	<0.05	0.02	-	-	-
MW-11	09/22/93	BCL	1,650	1,040	7.7	-	16.7	31	4	371	1.8	<5	149	-	-	-	-	-	-	-	-	-	-	-	-
MW-11	04/20/99	BSK	1,600	1,000	7.7	-	15.4	41	6	400	2	<40	180	700	<0.2	-	-	-	0.2	-	<0.05	0.4	-	-	-
MW-11	11/99	BSK	1,800	1,000	7.8	-	14.7	40	5	370	2	<40	180	620	<0.2	-	-	-	0.2	-	<0.05	0.4	-	-	-
MW-11	05/21/00	BSK	1,600	1,100	7.7	700	15.0	38	4.8	370	2	<40	190	854	<4	<2	-	0.1	0.2	-	0.08	0.39	-	-	-
MW-11	12/19/00	BSK	1,900	1,200	7.5	680	14.2	40	5.4	360	<2	<40	220	-	<4	<2	-	0.11	0.2	-	<0.05	0.37	-	-	-
MW-11	06/05/01	BSK	1,700	1,100	7.4	680	15.8	41	6.1	410	2	<40	230	830	-	<2	-	0.11	0.2	-	<0.05	0.43	-	-	-

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>					Cations				Anions				Trace Elements										
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
MW-11	05/02/02	BSK	1,900	1,200	7.8	680	-	46	7.4	380	<2	<60	230	680	<6	<3	-	0.14	0.2	-	<0.05	0.42	-	-	-
MW-12	09/22/93	BCL	1,730	1,010	8.0	-	10.6	49	11	314	2.9	180	280	-	-	-	-	-	-	-	-	-	-	-	
MW-12	04/21/99	BSK	4,900	3,100	7.3	1,900	22.5	140	46	1,200	47	<100	670	2,318	<10	<5	-	1.5	0.3	-	0.23	0.88	-	-	-
MW-12	05/20/00	BSK	4,700	3,000	7.1	2,000	21.7	110	29	990	43	<100	740	2,440	12	<5	-	1.2	0.3	-	0.23	0.7	-	-	-
MW-12	12/17/00	BSK	4,400	2,800	7.1	1,600	18.2	99	27	790	35	<100	650	1,952	<10	<5	-	0.99	0.3	-	0.16	0.53	-	-	-
MW-12	06/05/01	BSK	4,700	2,800	7.4	1,600	21.7	100	29	960	40	<100	710	1,952	<10	<5	-	1.1	0.3	-	0.2	0.85	-	-	-
MW-12	05/02/02	BSK	4,100	2,400	7.5	1,500	-	94	25	750	21	<120	600	1,500	<12	<6	-	0.8	0.2	-	0.15	0.58	-	-	-
MW-14	07/23/87	BCL	1,550	920	8.2	-	12.3	35	6.9	303	2.4	195	233	283	<0.4	0.04	<10	<0.1	-	-	0.06	0.18	-	-	-
MW-14	03/88	BCL	1,660	1,000	8.1	-	12.2	39	8	320	3	196	277	301	0.4	-	-	-	-	-	<0.05	0.2	-	-	-
MW-14	09/22/93	BCL	1,730	1,010	8.0	-	10.6	49	11	314	2.9	180	280	-	-	-	-	-	-	-	-	-	-	-	
MW-14	04/01/99	BSK	1,600	920	8.0	-	12.2	44	7	330	3	160	230	310	<0.2	-	-	-	0.2	-	<0.05	0.2	-	-	-
MW-14	11/99	BSK	1,500	900	7.9	-	10.8	39	5	270	1	210	300	330	<0.2	-	-	-	0.2	-	<0.05	0.2	-	-	-
MW-14	05/21/00	BSK	1,500	960	7.9	340	11.6	41	5.8	300	3	<30	200	415	<3	<1.5	-	0.07	0.2	-	<0.05	0.21	-	-	-
MW-14	12/19/00	BSK	1,500	910	7.7	330	7.8	49	9.9	230	4	120	180	-	<3	<1.5	-	0.07	0.2	-	<0.05	0.34	-	-	-
MW-14	06/06/01	BSK	1,600	980	7.4	310	6.1	90	17	240	4	160	260	378	-	<2	-	0.12	0.2	-	<0.05	0.65	-	-	-
MW-14	05/02/02	BSK	1,500	840	7.8	320	-	55	12	230	2	120	170	320	<5	<2.5	-	0.09	0.2	-	<0.05	0.43	-	-	-
MW-16	12/08/88	BCL	11,600	6,100	7.4	-	37.2	54	38	1,460	1,172	38	1,094	5,752	1.0	0.1	<10	3.7	0.2	-	0.33	0.18	-	-	-
MW-16	04/21/99	BSK	7,000	3,700	7.7	2,900	26.3	49	37	1,000	590	<150	630	3,538	<15	<7.5	-	2.6	0.3	-	0.59	0.16	-	-	-
MW-16	05/21/00	BSK	6,800	3,900	7.3	1,500	28.1	43	31	990	500	<150	680	1,830	<15	<7.5	-	2.5	0.3	-	0.62	0.16	-	-	-
MW-16	12/17/00	BSK	6,400	3,500	7.4	2,900	21.5	42	29	740	440	<140	620	3,538	<14	<7	-	2.2	0.3	-	0.82	0.16	-	-	-
MW-16	06/06/01	BSK	6,200	3,400	7.2	2,500	23.0	44	32	820	510	<80	650	3,050	-	<4	-	2.2	0.4	-	0.44	0.16	-	-	-
MW-16	05/02/02	BSK	6,000	3,000	7.6	2,400	-	30	22	640	330	<20	58	2,400	2.5	<1	-	1.6	0.3	-	0.34	0.11	-	-	-
MW-22	04/21/99	BSK	2,100	1,300	7.5	690	22.6	22	4.1	440	33	55	270	842	<4	<2	-	0.29	0.2	-	0.22	0.26	-	-	-
MW-22	05/21/00	BSK	2,000	1,200	7.6	700	24.3	17	3.4	420	33	51	270	854	<4	<2	-	0.24	0.2	-	0.72	0.24	-	-	-
MW-22	12/19/00	BSK	2,100	1,200	7.5	640	22.2	15	3	360	26	<50	270	781	<5	<2.5	-	0.2	0.1	-	0.64	0.18	-	-	-
MW-22	05/02/02	BSK	2,000	1,200	7.7	580	-	12	2.7	380	23	50	260	580	<5	<2.5	-	0.18	0.1	-	0.56	0.16	-	-	-
MW-22	06/06/01	BSK	2,000	1,200	7.4	660	22.3	19	4	410	30	<50	300	805	-	<2.5	-	0.23	0.2	-	0.53	0.26	-	-	-
PW-1	12/16/88	BCL	700	420	8.1	-	7.7	18	3	134	2	33	81	254	<1	-	-	<0.1	-	-	0.27	0.14	-	-	-
PW-1	04/22/99	BSK	2,400	1,500	7.4	830	12.0	86	16	460	23	55	320	1,013	<25	<2.5	<50	0.65	0.10	-	0.09	0.66	-	-	-
PW-1	05/20/00	BSK	2,800	1,700	6.9	940	11.9	78	16	440	27	66	390	1,147	<30	<3	2	0.81	0.10	-	0.09	0.74	-	-	-
PW-1	12/18/00	BSK	2,200	1,200	7.9	560	21.7	16	4.4	380	12	<50	340	683	<25	<2.5	<2	0.11	0.2	-	0.17	0.05	-	-	-
PW-1	06/04/01	BSK	3,400	2,100	7.0	1,600	16.3	81	22	640	49	<60	500	1,952	<30	<3	2	1.2	0.10	-	0.14	0.83	-	-	-
PW-4	04/27/99	BSK	-	1,200	8.4	320	31.1	15	1.4	470	1	120	410	390	<15	<1.5	<40	0.06	0.50	-	<0.05	0.03	-	-	-
PW-4	05/20/00	BSK	2,000	1,200	8.1	340	29.6	14	1.2	430	<2	120	400	415	<30	<3	<2	0.05	0.40	-	<0.05	0.03	-	-	-
PW-4	12/18/00	BSK	2,200	1,200	8.1	350	27.4	14	1.3	400	<2	110	420	427	<25	<2.5	<2	0.06	0.5	-	0.05	0.03	-	-	-
PW-4	06/04/01	BSK	2,000	1,200	8.0	350	30.3	14	1.2	440	<2	110	410	427	<16	<1.6	<2	0.05	0.50	-	<0.05	0.04	-	-	-
PW-6	12/13/88	BCL	800	495	8.3	-	24	3	<1	184	1	28	86	300	<1	-	-	<0.1	-	-	0.07	0.02	-	-	-

**Table C-4**  
**Summary of Ground-Water Quality Laboratory Results: Spreckels Sugar Co.**

Well ID	Sample Date	Lab <sup>1</sup>	Cations				Anions				Trace Elements														
			EC <sup>2</sup> (μmhos/cm)	TDS (mg/L)	pH	Total Alk. <sup>3</sup> (mg/L)	SAR	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	SO <sub>4</sub> (mg/L)	Cl (mg/L)	HCO <sub>3</sub> <sup>3</sup> (mg/L)	NO <sub>3</sub> <sup>3</sup> (mg/L)	F (mg/L)	As (μg/L)	Ba (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Se <sup>4</sup> (μg/L)	Zn (mg/L)
PW-6	04/22/99	BSK	1,200	720	8.3	400	18.0	14	1.9	270	3	44	120	488	<15	<1.5	<50	0.05	0.10	-	0.30	0.14	-	-	-
PW-6	05/20/00	BSK	1,300	800	7.4	430	16.4	17	2.2	270	<2	46	160	525	<16	<1.5	<2	0.07	0.10	-	0.17	0.17	-	-	-
PW-6	12/18/00	BSK	1,800	980	7.3	550	14.8	26	4.3	310	3	43	200	671	<20	2	<2	0.14	0.1	-	0.08	0.32	-	-	-
PW-6	06/04/01	BSK	1,200	770	7.4	390	13.7	20	3.1	250	2	46	150	476	<10	<1	<2	0.09	0.10	-	0.17	0.24	-	-	-
PW-7	12/16/88	BCL	470	300	8.7	-	17.9	1	<1	106	1	24	45	140	<1	-	-	<0.1	-	-	<0.05	<0.01	-	-	-
PW-7	04/22/99	BSK	760	490	8.2	240	27.6	3.1	0.3	190	1	<20	94	293	<10	<1	<50	<0.05	0.20	-	<0.05	0.01	-	-	-
PW-7	05/20/00	BSK	890	560	8.3	290	24.4	4.1	0.3	190	<2	24	120	354	11	<1	<2	<0.05	0.20	-	<0.05	0.02	-	-	-
PW-7	12/18/00	BSK	1,000	560	8.1	290	19.5	5.5	0.6	180	<2	34	100	354	<12	<1.2	<2	<0.05	0.1	-	<0.05	0.03	-	-	-
PW-7	06/04/01	BSK	960	650	8.1	300	23.6	5.6	0.6	220	<2	35	120	366	<10	<1	<2	<0.05	0.1	-	<0.05	0.04	-	-	-
PW-8	07/24/87	BCL	1,030	650	8.2	-	15.4	13	1.7	223	1.4	38	123	371	<0.4	0.06	<10	<0.1	-	-	0.16	0.14	-	-	-
PW-8	12/13/88	BCL	1,475	1,110	7.5	-	23.6	18	2	395	2	43	243	662	<1	-	-	<0.1	-	-	<0.05	0.17	-	-	-
PW-8	04/22/99	BSK	2,700	1,700	7.2	880	14.2	100	19	590	12	65	370	1,074	<30	<3	<50	0.56	0.1	-	0.09	1.1	-	-	-
PW-8	12/18/00	BSK	2,500	1,400	7.1	780	13.1	53	13	410	19	60	310	952	<25	<2.5	<2	0.67	<0.1	-	0.09	0.44	-	-	-
PW-8	06/04/01	BSK	2,700	1,700	7.7	860	14.9	64	17	520	28	65	390	1,049	<20	<2	<2	0.86	0.1	-	0.11	0.61	-	-	-
PW-9	12/13/88	BCL	650	390	8.5	-	24.5	1	<1	145	1	18	109	157	<1	-	-	<0.1	-	-	0.06	<0.01	-	-	-
PW-9	04/22/99	BSK	1,200	730	7.9	210	27.2	6.9	0.7	280	3	31	260	256	<15	<1.5	<50	<0.05	0.1	-	<0.05	0.04	-	-	-
PW-9	05/20/00	BSK	1,200	670	8.2	180	26.7	5.3	0.5	240	<2	35	260	220	<15	<1.5	3.0	<0.05	0.3	-	<0.05	<0.02	-	-	-
PW-9	12/18/00	BSK	1,300	660	8.2	170	26.9	4.7	0.5	230	2	<30	240	207	<15	<1.5	2.0	<0.05	0.3	-	<0.05	0.02	-	-	-
PW-9	06/04/01	BSK	1,100	680	8.1	170	27.2	4.6	0.5	230	2	38	220	207	<10	<1	<2	<0.05	0.2	-	<0.05	0.03	-	-	-
PW-10	12/14/88	BCL	690	430	8.4	-	10.2	11	2	140	1	35	87	198	3.0	0.2	<10	<0.1	-	-	0.12	0.05	-	-	-
PW-10	04/22/99	BSK	820	510	8.2	250	10.5	18	2.7	180	3	40	99	305	<10	<1	<50	0.05	0.1	-	0.06	0.08	-	-	-
PW-10	05/20/00	BSK	840	510	7.9	250	10.4	18	2.8	180	<2	39	110	305	<10	<1	<2	<0.05	0.2	-	<0.05	0.08	-	-	-
PW-10	12/18/00	BSK	930	520	8.0	240	9.8	16	2.6	160	<2	37	110	293	<10	<1	<2	<0.05	0.2	-	0.06	0.07	-	-	-
PW-10	06/04/01	BSK	910	590	7.8	260	9.6	21	3.5	180	<2	41	120	317	<10	<1	<2	<0.05	0.2	-	<0.05	0.11	-	-	-

1. Laboratory Abbreviations: BCL - BC Laboratories, Bakersfield; BSK - BSK Analytical Laboratories, Fresno; NA - Not Available

2. Electrical Conductivity at 25°C

3. HCO<sub>3</sub>, total alkalinity and NO<sub>3</sub> reported as HCO<sub>3</sub>, CaCO<sub>3</sub> and NO<sub>3</sub>, respectively.

4. Only selenium results analysed with a detection limit ≤0.5 μg/L are reported.

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>						General Mineral						Trace Elements										
		Cations			Anions																		
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
<b>Columbia Canal</b>																							
02/03/99	BSK	220	140	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	
04/21/99	BSK	420	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	2.00	
05/26/99	BSK	430	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	
06/30/99	BSK	300	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
07/08/99	FGL	248	190	8.6	1.4	12	6	23	2	26	25	50	50	0.7	-	0.1	-	-	-	-	-	-	
07/28/99	BSK	300	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
09/29/99	BSK	450	-	-	-	-	-	-	-	-	-	-	-	<1	-	0.2	-	-	-	-	-	-	
10/27/99	BSK	500	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
11/17/99	BSK	500	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
06/14/00	FGL	258	150	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
07/10/00	FGL	348	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/12/00	FGL	346	210	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/09/00	FGL	348	210	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/25/00	FGL	324	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
09/13/00	FGL	348	200	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
10/11/00	FGL	451	310	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
07/19/01	FGL	421	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
09/12/01	BSK	660	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/03/01	BSK	630	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
06/25/02	FGL/OBL	383	240	7.8	1.6	19	10	34	2	35	43	100	80	2.4	<0.1	3	0.16	<10	0.56	0.03	5.1	0.71	<0.02
<b>Mendota Dam</b>																							
07/08/99	FGL	395	240	7.8	1.6	20	10	35	2	47	44	110	90	4.4	-	-	0.2	-	-	-	-	-	-
07/21/99	FGL	228	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/11/99	FGL	296	170	-	3.5	16	8	68	4	29	27	80	70	4	-	-	0.1	-	-	-	-	-	-
08/25/99	FGL	301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
09/08/99	FGL	378	230	7.7	1.8	18	10	39	2	37	40	100	80	3.2	-	-	-	-	-	-	-	-	
09/22/99	FGL	507	-	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11/11/99	FGL	601	350	7.8	2.4	25	13	60	3	61	77	110	90	7.3	-	-	0.2	-	-	-	-	-	-
07/10/00	FGL	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/25/00	FGL	356	-	-	-	-	-	-	-	30	37	-	-	-	-	0.1	-	-	-	-	-	-	
11/06/00	FGL	447	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/19/01	FGL/OBL	390	-	-	-	-	-	-	-	35	52	-	-	-	-	<3	<0.25	-	-	-	3.4	0.59	-
11/05/01	FGL/OBL	668	380	8.0	2.7	26	17	73	4	51	110	120	90	4	<0.1	<2	0.25	<0.01	0.24	0.02	2.8	0.59	<0.02
06/25/02	FGL/OBL	344	210	7.9	1.4	18	10	30	2	31	35	90	70	2.6	<0.1	3	0.15	<0.01	0.63	0.04	1.6	0.68	<0.02
<b>SLCC Arroyo Canal</b>																							
02/03/99	BSK	230	130	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	
04/21/99	BSK	510	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-	-	-	-	4.00	
05/26/99	BSK	420	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
06/30/99	BSK	530	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	3.00	

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>					General Mineral						Trace Elements											
		Cations				Anions																	
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
07/28/99	BSK	320	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
09/29/99	BSK	640	-	-	-	-	-	-	-	-	-	-	-	8	-	-	0.3	-	-	-	-	2.00	-
10/27/99	BSK	520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
11/17/99	BSK	530	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
06/14/00	FGL	470	280	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-
07/17/00	FGL	460	280	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
08/09/00	FGL	420	240	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
09/13/00	FGL	436	250	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
10/11/00	FGL	509	300	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-
12/13/00	FGL	641	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
09/12/01	BSK	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
10/03/01	BSK	670	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	4.00	-
<b>CCID Main Canal</b>																							
01/08/99	USBR	366	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-
02/03/99	BSK	240	130	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	-
02/04/99	USBR	254	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	-
03/04/99	USBR	307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	-
04/06/99	USBR	521	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.90	-
04/21/99	BSK	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	3.00	-
05/06/99	USBR	376	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50	-
05/26/99	BSK	440	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	-	-	-	-	-	-	-
06/03/99	USBR	427	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-
06/30/99	BSK	290	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	3.00	-
07/06/99	USBR	287	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-
07/08/99	FGL	323	170	7.8	1.4	18	9	29	2	35	32	90	70	3.8	-	-	0.1	-	-	-	-	-	-
07/28/99	BSK	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
08/04/99	USBR	277	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-
08/11/99	FGL	280	160	-	1.1	16	8	22	2	28	24	80	70	2.9	-	-	0.1	-	-	-	-	-	-
09/02/99	USBR	298	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.70	-
09/08/99	FGL	354	200	8.3	1.6	17	10	34	2	33	39	100	80	2.7	-	-	-	-	-	-	-	-	-
09/29/99	BSK	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
10/05/99	USBR	571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-
10/27/99	BSK	530	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-
11/02/99	USBR	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	-
11/11/99	FGL	518	300	7.9	2.4	20	12	54	3	39	81	90	70	4.4	-	-	0.1	-	-	-	-	-	-
11/17/99	BSK	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	2.00	-
12/02/99	USBR	965	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	-
01/04/00	USBR	1,018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.20	-
02/02/00	USBR	767	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.20	-
02/29/00	USBR	223	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.70	-
04/04/00	USBR	521	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.30	-

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>					General Mineral						Trace Elements											
		Cations				Anions				Total													
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
05/02/00	USBR	414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-	
05/31/00	USBR	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-	
06/14/00	FGL	460	270	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	
07/06/00	USBR	285	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.70	-	
07/10/00	FGL	426	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/12/00	FGL	312	200	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/01/00	USBR	316	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
08/09/00	FGL	321	200	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/25/00	FGL	344	-	-	-	-	-	-	-	28	35	-	-	-	-	0.1	-	-	-	-	-	-	
09/06/00	USBR	361	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	-	
09/13/00	FGL	343	200	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/03/00	USBR	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60	-	
10/11/00	FGL	469	270	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	
10/31/00	USBR	422	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	
11/06/00	FGL	474	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12/05/00	USBR	513	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	-	
12/13/00	FGL	704	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	
01/03/01	USBR	222	-	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.65	-	
02/07/01	USBR	595	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.08	-	
03/08/01	USBR	562	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.32	-	
04/03/01	USBR	778	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.96	-	
05/09/01	USBR	513	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.56	-	
06/06/01	USBR	488	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.99	-	
06/26/01	USBR	452	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
07/19/01	FGL/OBL	410	-	-	-	-	-	-	-	38	54	-	-	-	-	<3	<0.25	-	-	-	3.6	0.60	
07/24/01	USBR	423	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.89	-	
08/29/01	USBR	639	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.78	-	
09/12/01	BSK	660	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/02/01	USBR	720	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48	-	
10/03/01	BSK	630	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/30/01	USBR	666	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
11/05/01	FGL/OBL	657	390	8.0	2.8	24	16	72	4	48	115	110	90	3.7	<0.1	<2	0.21	<0.01	0.24	0.02	3.3	0.57	<0.02
12/05/01	USBR	982	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.82	-	
01/08/02	USBR	698	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/07/02	USBR	197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
06/25/02	FGL/OBL	387	240	7.9	1.5	20	11	34	2	36	43	90	80	3.0	<0.1	3	0.17	<0.01	0.95	0.08	4.2	0.79	0.02

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>						General Mineral						Trace Elements										
		Cations			Anions																		
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
<b>Mowry Bridge</b>																							
07/08/99	FGL	291	180	-	-	-	-	-	-	30	27	-	-	-	-	-	-	-	-	-	-	-	
07/21/99	FGL	274	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/11/99	FGL	266	170	-	-	-	-	-	-	29	22	-	-	-	-	-	-	-	-	-	-	-	
08/25/99	FGL	293	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
09/08/99	FGL	343	200	8.3	-	-	-	-	-	29	39	-	-	-	-	-	-	-	-	-	-	-	
09/22/99	FGL	550	-	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/10/00	FGL	394	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/25/00	FGL	312	-	-	-	-	-	-	-	24	28	-	-	-	-	-	-	0.1	-	-	-	-	
11/06/00	FGL	509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/19/01	FGL/OBL	430	-	-	-	-	-	-	-	43	57	-	-	-	-	<3	<0.25	-	-	-	3.6	0.70	
11/05/01	FGL/OBL	652	370	7.9	2.8	23	16	72	4	44	118	110	90	3.4	<0.1	<2	0.2	<0.01	0.25	0.02	2.6	0.51	<0.02
06/25/02	FGL/OBL	359	250	7.7	0.1	19	10	31	2	34	38	90	80	2.8	<0.1	2	0.17	<0.01	0.97	0.07	1.3	0.81	<0.02
<b>DMC Check 21</b>																							
01/08/99	USBR	464	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	
02/04/99	USBR	322	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	
03/04/99	USBR	308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.60	
04/06/99	USBR	575	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.20	
05/06/99	USBR	372	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	
05/26/99	BSK	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	
06/03/99	USBR	434	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.70	
06/30/99	BSK	300	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
07/06/99	USBR	291	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	
07/08/99	FGL	291	170	7.8	1.3	17	9	26	2	30	26	80	70	3.7	-	-	0.1	-	-	-	-	-	
08/04/99	USBR	264	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	
08/11/99	FGL	269	170	-	1.1	15	8	22	2	28	21	70	60	2.8	-	-	0.1	-	-	-	-	-	
09/02/99	USBR	309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	
09/08/99	FGL	344	130	8.2	1.6	16	9	33	2	29	39	90	70	2.1	-	-	-	-	-	-	-	-	
10/05/99	USBR	448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60	
11/02/99	USBR	492	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	
11/11/99	FGL	530	300	8.2	2.5	18	12	56	3	33	87	80	70	3.2	-	-	0.1	-	-	-	-	-	
11/17/99	BSK	480	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
12/02/99	USBR	522	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.40	
01/04/00	USBR	536	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.30	
02/02/00	USBR	623	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.90	
02/29/00	USBR	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	
04/04/00	USBR	580	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.30	
05/02/00	USBR	419	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	
05/31/00	USBR	516	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>					General Mineral						Trace Elements											
		Cations				Anions				Total													
Sample Date	Lab <sup>1</sup>	EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
06/14/00	FGL	414	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/06/00	USBR	301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	-	
07/12/00	FGL	289	210	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/01/00	USBR	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
08/09/00	FGL	304	190	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/25/00	FGL	316	-	-	-	-	-	-	-	25	29	-	-	-	-	0.1	-	-	-	-	-	-	
09/06/00	USBR	351	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	-	
09/13/00	FGL	367	240	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/03/00	USBR	416	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	-	
10/11/00	FGL	464	270	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
10/31/00	USBR	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.20	-	
11/06/00	FGL	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12/05/00	USBR	492	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	
12/13/00	FGL	581	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
01/03/01	USBR	358	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
02/07/01	USBR	570	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.75	-	
03/08/01	USBR	543	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.38	-	
04/03/01	USBR	857	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.32	-	
05/09/01	USBR	524	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.84	-	
06/06/01	USBR	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.86	-	
06/26/01	USBR	434	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
07/19/01	FGL/OBL	418	-	-	-	-	-	-	-	40	55	-	-	-	<3	<0.25	-	-	-	3.1	0.67	-	
07/24/01	USBR	469	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	-	
08/29/01	USBR	620	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.66	-	
09/12/01	BSK	660	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
09/20/01	FGL	770	479	8.1	3.6	26	20	99	4	57	150	120	90	<0.4	0.1	3	0.25	<0.01	0.37	0.03	2	-	<0.02
10/02/01	USBR	686	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48	-	
10/03/01	BSK	570	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/30/01	USBR	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
11/05/01	FGL/OBL	651	380	7.9	2.8	24	16	72	4	44	117	110	90	3.4	<0.1	<2	0.2	<0.01	0.22	0.02	3.0	0.50	<0.02
12/05/01	USBR	767	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.56	-	
01/08/02	USBR	687	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/07/02	USBR	698	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
06/05/02	FGL/OBL	504	320	7.9	1.9	25	14	48	3	60	66	100	80	4.8	<0.1	-	0.24	<0.01	0.21	0.02	1.0	1.19	<0.02
06/25/02	FGL/OBL	340	220	7.7	0.1	18	10	29	2	32	36	90	70	2.6	<0.1	<2	0.15	<0.01	0.85	0.06	1.3	0.78	<0.02
07/09/02	FGL	321	210	8.0	1.4	18	10	30	2	26	32	90	70	2.2	<0.1	-	0.15	<0.01	0.41	0.02	-	-	<0.02
08/09/02	FGL/OBL	474	270	7.5	2.4	16	12	52	3	21	86	80	70	1.4	<0.1	2	0.13	<0.01	0.35	0.03	<1.0	0.79	0.03
09/08/02	FGL	535	304	7.8	2.4	19	13	55	3	27	96	90	80	1.4	<0.1	-	0.14	<0.01	0.21	0.01	-	-	<0.02
09/20/02	FGL/OBL	623	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	1.34	-
10/04/02	FGL	637	381	7.9	3.1	20	16	77	4	31	121	110	90	1.8	<0.1	3	0.20	<0.01	0.21	0.02	-	-	<0.02
11/04/02	FGL/OBL	605	353	8.1	3.0	20	15	73	4	37	102	100	80	2.2	<0.1	<2	0.15	<0.01	0.13	0.01	<1.0	<0.4	<0.02

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>						General Mineral						Trace Elements											
		Cations			Anions																			
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)	
<b>CCID Outside Canal</b>																								
01/08/99	USBR	456	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	-	
02/03/99	BSK	280	160	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
02/04/99	USBR	312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	
03/04/99	USBR	307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.60	-	
04/06/99	USBR	580	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.90	-	
04/21/99	BSK	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	4.00	-
05/06/99	USBR	371	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50	-
05/26/99	BSK	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	
06/03/99	USBR	411	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-
06/30/99	BSK	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
07/06/99	USBR	291	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.20	-
07/08/99	FGL	295	180	7.9	1.3	17	9	26	2	31	28	90	70	3.4	-	-	0.1	-	-	-	-	-	-	
07/28/99	BSK	260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/04/99	USBR	352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-
08/11/99	FGL	270	160	-	1.2	14	7	22	2	28	22	80	60	2.8	-	-	0.1	-	-	-	-	-	-	
09/02/99	USBR	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-
09/08/99	FGL	346	210	8.5	1.4	16	9	29	2	29	39	90	70	2.3	-	-	-	-	-	-	-	-	-	
09/29/99	BSK	480	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	0.2	-	-	-	-	-	
10/05/99	USBR	447	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	-
10/27/99	BSK	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
11/02/99	USBR	471	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	-
11/11/99	FGL	596	350	8.3	2.4	26	14	60	3	63	79	110	90	7.4	-	-	0.2	-	-	-	-	-	-	
11/17/99	BSK	480	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	
12/02/99	USBR	237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.20	-
01/04/00	USBR	742	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-
02/02/00	USBR	754	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.20	-
02/29/00	USBR	444	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	-
04/04/00	USBR	574	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.70	-
05/02/00	USBR	428	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	-
05/31/00	USBR	507	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.20	-
06/14/00	FGL	478	280	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-
07/06/00	USBR	278	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.80	-
07/10/00	FGL	426	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/12/00	FGL	296	200	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/01/00	USBR	316	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60	-
08/09/00	FGL	314	180	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
08/25/00	FGL	323	-	-	-	-	-	-	-	26	32	-	-	-	-	-	0.1	-	-	-	-	-	-	
09/06/00	USBR	371	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	-
09/13/00	FGL	350	200	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	
10/03/00	USBR	398	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-
10/11/00	FGL	469	270	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	
10/31/00	USBR	428	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>						General Mineral						Trace Elements											
		Cations					Anions				Total													
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR		Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
11/06/00	FGL	504	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12/05/00	USBR	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	-	
12/13/00	FGL	706	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	
01/03/01	USBR	592	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
02/07/01	USBR	514	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10	-	
03/08/01	USBR	550	-	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.18	-	
04/03/01	USBR	683	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.69	-	
05/09/01	USBR	525	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.95	-	
06/06/01	USBR	463	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.92	-	
06/26/01	USBR	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	
07/19/01	FGL/OBL	417	-	-	-	-	-	-	-	40	55	-	-	-	-	<3	<0.25	-	-	-	3.8	0.69	-	
07/24/01	USBR	479	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	
08/29/01	USBR	624	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.93	-	
09/12/01	BSK	660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	3.00	-	
10/02/01	USBR	731	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.40	-	
10/03/01	BSK	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	
10/30/01	USBR	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.49	-	
11/05/01	FGL/OBL	662	370	8.0	2.9	24	17	75	4	46	119	110	90	3.7	0.1	<2	0.2	<0.01	0.26	0.02	2.5	0.51	<0.02	
12/05/01	USBR	866	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.68	-	
01/08/02	USBR	887	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
02/07/02	USBR	336	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
06/25/02	FGL/OBL	387	250	7.7	0.1	21	11	35	3	40	45	100	80	3.2	<0.1	<2	0.17	<0.01	0.81	0.06	1.9	0.83	<0.02	
<b>Firebaugh Intake Canal</b>																								
02/03/99	BSK	280	170	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	-	
04/21/99	BSK	400	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	3.00	-	
05/26/99	BSK	440	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	-	-	-	-	-	-	-	
06/30/99	BSK	290	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	2.00	-	
07/08/99	FGL	293	170	7.8	1.2	15	8	24	2	30	27	90	70	3.4	-	0.1	-	-	-	-	-	-	-	
07/28/99	BSK	260	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	
08/11/99	FGL	269	170	-	1.2	14	8	23	2	28	22	80	60	2.7	-	0.1	-	-	-	-	-	-	-	
09/08/99	FGL	366	210	8.6	1.6	17	9	32	2	34	41	90	80	2.7	-	-	-	-	-	-	-	-	-	
09/29/99	BSK	540	-	-	-	-	-	-	-	-	-	-	-	5	-	0.3	-	-	-	-	-	2.00	-	
10/27/99	BSK	500	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	
11/11/99	FGL	528	300	8.1	2.4	18	11	52	3	38	84	90	70	4.1	-	0.1	-	-	-	-	-	-	-	
11/17/99	BSK	490	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	
06/14/00	FGL	492	280	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	
07/10/00	FGL	520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/12/00	FGL	301	190	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	
08/09/00	FGL	335	190	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>						General Mineral						Trace Elements											
		Cations					Anions																	
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR		Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
08/25/00	FGL	338	-	-	-	-	-	-	-	-	27	35	-	-	-	-	-	0.1	-	-	-	-	-	-
09/13/00	FGL	350	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-
10/11/00	FGL	482	270	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-
11/06/00	FGL	464	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/13/00	FGL	705	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-
07/19/01	FGL/OBL	423	-	-	-	-	-	-	-	-	42	57	-	-	-	-	<3	<0.25	-	-	-	3.5	0.67	-
09/12/01	BSK	660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
10/03/01	BSK	590	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-
11/05/01	FGL	664	390	8.0	2.8	25	17	73	4	49	117	110	90	3.9	<0.1	<2	0.22	<0.01	0.26	0.02	3.1	0.46	<0.02	
06/25/02	FGL	401	260	7.9	0.1	21	11	36	2	42	46	100	80	3.1	<0.1	2	0.18	<0.01	0.64	0.05	2.1	0.84	0.03	
<b>West of Fordel</b>																								
07/08/99	FGL	402	260	-	-	-	-	-	-	-	49	46	-	-	-	-	-	-	-	-	-	-	-	-
07/21/99	FGL	285	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/11/99	FGL	343	210	-	-	-	-	-	-	-	39	35	-	-	-	-	-	-	-	-	-	-	-	-
08/25/99	FGL	325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/08/99	FGL	417	240	9.0	-	-	-	-	-	-	45	47	-	-	-	-	-	-	-	-	-	-	-	-
09/22/99	FGL	469	-	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07/10/00	FGL	354	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/25/00	FGL	333	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/06/00	FGL	494	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07/19/01	FGL	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/05/01	FGL/OBL	675	380	8.7	3.0	23	16	76	4	45	127	110	90	2.6	<0.1	<2	0.2	<0.01	0.23	0.03	2.4	0.51	<0.02	
06/25/02	FGL/OBL	358	220	8.7	0.1	19	10	31	2	34	39	90	80	3.0	<0.1	3	0.16	<0.01	0.42	0.03	1.4	0.71	<0.02	
<b>Etchegoainberry</b>																								
07/08/99	FGL	380	230	-	-	-	-	-	-	-	43	42	-	-	-	-	-	-	-	-	-	-	-	-
07/21/99	FGL	400	-	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/11/99	FGL	364	230	-	-	-	-	-	-	-	38	40	-	-	-	-	-	-	-	-	-	-	-	-
08/25/99	FGL	372	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/08/99	FGL	646	380	8.9	-	-	-	-	-	-	67	92	-	-	-	-	-	-	-	-	-	-	-	-
09/22/99	FGL	685	-	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07/10/00	FGL	471	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/25/00	FGL	474	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/06/00	FGL	507	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07/19/01	FGL	423	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/05/01	FGL/OBL	854	500	8.2	4.7	24	14	118	4	80	146	150	120	1.5	0.2	<2	0.3	<0.01	0.26	0.08	4.1	0.47	<0.02	
06/25/02	FGL/OBL	439	280	8.0	1.9	20	11	43	3	41	54	100	80	2.4	<0.1	3	0.18	<0.01	0.45	0.05	2.4	0.67	<0.02	
<b>Mendota Wildlife Area<sup>4</sup></b>																								
07/08/99	FGL	513	310	8.0	2.8	19	9	60	2	55	68	110	90	2.9	-	-	0.2	-	-	-	-	-	-	-
08/11/99	FGL	633	360	3.9	-	18	9	82	2	71	90	130	100	1.6	-	-	0.2	-	-	-	-	-	-	-
09/08/99	FGL	920	530	9.0	6.4	21	10	142	3	89	148	110	120	<0.4	-	-	-	-	-	-	-	-	-	-

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>						General Mineral						Trace Elements								
		Cations					Anions														
		Ca	Mg	Na	K		SO <sub>4</sub>	Cl	HCO <sub>3</sub> <sup>3</sup>	Alkalinity <sup>3</sup>		NO <sub>3</sub> <sup>3</sup>	F	As	B	Cu	Fe	Mn	Mo	Se	Zn
		(mg/l)	(mg/l)	(mg/l)	(mg/l)		(mg/l)	(mg/l)	(mg/l)	(mg/l)		(mg/l)	(mg/l)	(ug/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(ug/l)	(ug/l)	(mg/l)
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR																
11/11/99	FGL	716	440	9.2	3.7	24	13	90	3	77	97	140	110	2.7	-	-	0.2	-	-	-	-
07/10/00	FGL	706	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/25/00	FGL	777	-	-	-	-	-	-	-	75	110	-	-	-	-	-	0.2	-	-	-	-
10/25/00	FGL	721	442	8.4	4.0	25	14	100	4	64	104	130	110	1.3	<0.1	-	0.27	<0.01	0.27	0.02	-
11/18/00	FGL	502	314	7.7	2.5	22	12	59	3	42	73	100	80	3	<0.1	-	0.19	<0.01	0.26	0.01	-
12/15/00	FGL	801	484	7.7	4.6	25	15	118	4	71	128	120	100	3.3	<0.1	-	0.28	<0.01	0.41	0.02	-
01/31/01	FGL	853	540	7.8	4.3	29	17	119	4	94	139	130	110	3.4	<0.1	-	0.28	<0.01	0.78	0.03	-
02/22/01	FGL	682	430	7.8	2.7	31	17	76	4	85	89	120	100	6.6	<0.1	-	0.33	<0.01	0.78	0.03	-
03/28/01	FGL	670	440	7.9	3.1	29	15	83	4	94	87	120	100	4.1	<0.1	-	0.35	<0.01	0.57	0.03	-
04/25/01	FGL	772	490	8.2	4.0	28	14	103	4	104	96	140	120	3.5	<0.1	-	0.41	<0.01	0.34	0.02	-
05/30/01	FGL	1,030	650	8.5	6.1	27	14	157	4	118	163	170	140	<0.4	<0.1	<2	0.32	<0.01	0.44	0.07	6
06/26/01	FGL	711	457	8.4	4.1	24	12	98	3	79	100	140	110	1.2	0.2	2	0.26	<0.01	0.31	0.05	4
07/19/01	FGL/OBL	573	367	8.8	3.2	23	12	76	3	58	75	120	100	<0.4	0.1	<3	0.2	<0.01	0.39	0.04	4.2
08/15/01	FGL	660	430	9.0	4.0	22	13	95	3	59	109	130	100	<0.4	0.1	2	0.21	<0.01	0.24	0.04	3
09/10/01	FGL	1,010	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/20/01	FGL	777	492	8.7	4.3	24	16	112	4	60	146	130	110	<0.4	0.1	2	0.21	<0.01	0.37	0.04	3
11/05/01	FGL/OBL	1,060	610	8.4	6.2	25	15	158	4	102	172	190	160	<0.4	0.2	<2	0.33	<0.01	0.27	0.04	8.4
06/05/02	FGL/OBL	678	440	8.4	3.3	24	15	84	4	69	109	130	110	1.7	<0.1	-	0.22	<0.01	0.16	0.02	2.0
06/25/02	FGL/OBL	667	410	8.6	0.1	24	12	85	3	72	102	130	110	1.2	0.1	<2	0.23	<0.01	0.41	0.03	3.0
07/09/02	FGL	533	340	8.6	2.9	21	11	67	2	53	69	120	100	1.2	<0.1	2	0.20	<0.01	0.27	0.02	-
07/15/02	FGL	514	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07/25/02	FGL	500	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/09/02	FGL/OBL	659	400	8.4	3.9	19	12	89	3	49	113	110	90	<0.4	<0.1	<2	0.17	<0.01	0.15	0.02	2.2
08/14/02	FGL	613	370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/19/02	FGL	658	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/08/02	FGL	849	515	8.3	4.2	25	15	108	3	75	149	140	120	<0.4	<0.1	-	0.25	<0.01	0.24	0.05	-
09/20/02	FGL/OBL	824	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	0.50	-
09/27/02	FGL	823	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/04/02	FGL	850	520	8.3	4.5	24	17	118	4	130	165	130	110	0.5	<0.1	2	0.20	<0.01	0.14	0.04	-
10/11/02	FGL	717	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/17/02	FGL	654	380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/04/02	FGL/OBL	620	366	8.4	2.8	22	15	70	4	42	101	110	90	1.6	<0.1	<2	0.17	<0.01	0.19	0.02	<1.0
<b>Lateral 6 &amp; 7</b>																					
08/25/99	FGL	664	390	8.6	3.8	24	12	91	2	71	94	120	110	<0.4	-	-	0.2	-	-	-	-
09/29/99	FGL	1,160	670	-	-	-	-	-	-	116	192	-	-	<0.4	-	-	0.2	-	-	-	<1
10/25/00	FGL	735	474	8.5	4.0	28	14	105	3	68	105	150	120	1.4	<0.1	-	0.28	<0.01	0.60	0.04	-
11/18/00	FGL	719	451	8.4	4.1	26	13	102	3	64	103	140	120	<0.4	<0.1	-	0.24	<0.01	0.36	0.02	-
12/15/00	FGL	605	379	8.2	2.9	28	14	76	3	52	85	120	100	1.3	<0.1	-	0.22	<0.01	0.68	0.03	-
01/31/01	FGL	742	480	7.8	3.9	27	14	100	4	73	133	130	110	2.5	0.1	-	0.25	<0.01	1.00	0.02	-
02/22/01	FGL	787	500	8.4	3.5	36	15	100	4	79	117	150	120	1	0.1	-	0.27	<0.01	0.60	0.03	-
																					<0.02

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>	General Mineral								Trace Elements													
		Cations				Anions																	
		Ca	Mg	Na	K	SO <sub>4</sub>	Cl	HCO <sub>3</sub> <sup>3</sup>	Alkalinity <sup>3</sup>	NO <sub>3</sub> <sup>3</sup>	As	B	Cu	Fe	Mn	Mo	Se	Zn					
EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR																				
03/28/01	FGL	680	450	8.4	2.9	33	16	80	4	84	91	140	120	<0.4	<0.1	-	0.32	<0.01	0.47	0.02	-	-	<0.02
04/25/01	FGL	718	480	8.5	4.5	27	9	106	6	49	87	190	160	2.5	<0.1	-	0.26	<0.01	0.40	0.02	-	-	<0.02
05/30/01	FGL	1,020	650	8.4	5.2	33	17	148	4	122	159	170	140	0.9	<0.1	<2	0.33	<0.01	0.50	0.04	5	-	<0.02
06/26/01	FGL	820	529	9.0	4.5	29	14	117	3	107	119	120	120	<0.4	0.2	4	0.33	<0.01	0.54	0.04	6	-	<0.02
07/19/01	FGL/OBL	677	446	8.7	3.8	26	14	96	3	75	92	140	110	<0.4	0.1	<3	0.23	<0.01	0.75	0.04	5.5	0.69	<0.02
08/15/01	FGL	685	440	8.7	4.5	24	14	95	3	65	109	130	110	<0.4	0.1	3	0.21	<0.01	0.44	0.05	3	-	<0.02
09/20/01	FGL	1,020	650	8.4	5.7	30	18	159	4	99	170	170	140	<0.4	0.2	3	0.27	<0.01	0.79	0.04	5	-	<0.02
11/05/01	FGL/OBL	889	560	8.5	4.8	27	16	127	4	76	153	160	-	<0.4	0.1	<2	0.26	<0.01	0.48	0.05	5.4	0.48	<0.02
06/05/02	FGL/OBL	720	470	8.2	3.5	27	15	91	4	73	105	150	120	3.4	0.1	-	0.25	<0.01	0.52	0.02	1.0	0.90	<0.02
07/09/02	FGL	459	300	8.2	2.3	22	11	54	3	43	54	110	90	1.0	<0.1	-	0.23	<0.01	0.75	0.03	-	-	0.03
07/15/02	FGL	533	340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/25/02	FGL	522	310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/09/02	FGL/OBL	675	420	8.0	3.8	22	13	91	3	54	109	130	100	<0.4	<0.1	2	0.21	<0.01	0.80	0.05	1.6	0.51	0.03
08/14/02	FGL	680	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/19/02	FGL	680	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
09/08/02	FGL	742	451	8.2	3.7	25	14	93	4	56	129	130	110	<0.4	<0.1	-	0.22	<0.01	0.49	0.03	-	-	<0.02
09/20/02	FGL/OBL	874	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	0.71	-	
09/27/02	FGL	906	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10/04/02	FGL	851	529	8.2	4.5	27	17	122	4	65	154	140	120	<0.4	0.1	2	0.21	<0.01	0.30	0.02	-	-	<0.02
10/11/02	FGL	872	520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10/17/02	FGL	781	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11/04/02	FGL/OBL	694	400	8.6	3.3	24	16	84	4	43	109	120	100	<0.4	<0.1	<2	0.17	<0.01	0.26	0.02	1.35	<0.4	0.02
<b>James ID (Booster Plant)</b>																							
10/25/00	FGL	836	537	8.2	5.2	26	13	131	3	83	131	150	120	<0.4	0.1	-	0.34	<0.01	0.44	0.01	-	-	<0.02
11/18/00	FGL	710	449	8.4	4.2	24	13	102	3	65	102	140	110	<0.4	<0.1	-	0.25	<0.01	0.13	<0.01	-	-	<0.02
12/15/00	FGL	848	533	8.2	6.0	21	10	133	3	84	122	160	130	<0.4	0.1	-	0.38	<0.01	0.40	<0.01	-	-	<0.02
01/31/01	FGL	710	450	8.2	4.2	24	12	102	3	60	109	140	110	<0.4	0.1	-	0.3	<0.01	0.34	<0.01	-	-	<0.02
03/28/01	FGL	805	510	8.6	4.1	30	15	110	4	90	131	110	110	1.4	<0.1	-	0.35	<0.01	0.16	<0.01	-	-	<0.02
04/25/01	FGL	826	550	8.4	6.4	27	5	138	7	53	107	210	170	4.5	0.2	-	0.37	0.02	0.12	0.01	-	-	<0.02
05/30/01	FGL	824	540	8.7	5.7	29	5	126	6	53	125	190	170	4.2	0.1	10	0.38	<0.01	0.32	0.02	8	-	<0.02
06/26/01	FGL	784	514	8.7	4.4	27	13	110	3	94	117	150	120	<0.4	0.2	2	0.29	<0.01	0.56	0.05	5	1	<0.02
07/19/01	FGL/OBL	665	442	8.6	3.8	26	14	96	3	72	91	140	110	<0.4	0.1	<3	0.23	<0.01	1.17	0.06	4.9	0.57	<0.02
08/15/01	FGL	687	440	8.5	3.9	25	14	97	3	66	109	130	110	<0.4	0.1	3	0.21	<0.01	0.51	0.05	3	-	<0.02
09/20/01	FGL	1,030	656	8.2	5.6	30	19	160	4	99	174	170	140	<0.4	0.2	3	0.28	<0.01	0.69	0.04	5	-	<0.02
11/05/01	FGL/OBL	933	580	8.4	4.8	28	17	131	4	81	161	160	-	<0.4	0.2	<2	0.27	<0.01	0.23	0.01	6.7	0.59	<0.02
06/05/02	FGL/OBL	708	440	8.0	3.4	26	15	88	4	70	99	140	120	1.3	<0.1	-	0.25	<0.01	0.38	0.02	2.0	0.95	<0.02
07/09/02	FGL	463	300	8.3	2.4	21	11	54	3	44	54	110	90	0.9	<0.1	-	0.22	<0.01	0.63	0.02	-	-	0.06
07/15/02	FGL	530	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
07/25/02	FGL	512	310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/09/02	FGL/OBL	672	420	7.7	2.5	22	13	88	3	54	109	130	100	<0.4	<0.1	2	0.13	<0.01	0.33	0.03	1.2	0.64	0.02
08/14/02	FGL	666	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
08/19/02	FGL	671	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
09/08/02	FGL	737	470	8.1	3.6	24	14	110	3	55	134	130	100	<0.4	<0.1	-	0.22	<0.01	0.31	0.20	-	-	<0.02

**Table C-5**  
**Surface-Water Quality Laboratory Results**

Sample Date	Lab <sup>1</sup>					General Mineral						Trace Elements											
		Cations				Anions																	
		EC <sup>2</sup> (umhos/cm)	TDS (mg/l)	pH	SAR	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	HCO <sub>3</sub> <sup>3</sup> (mg/l)	Alkalinity <sup>3</sup> (mg/l)	NO <sub>3</sub> <sup>3</sup> (mg/l)	F (mg/l)	As (ug/l)	B (mg/l)	Cu (mg/l)	Fe (mg/l)	Mn (mg/l)	Mo (ug/l)	Se (ug/l)	Zn (mg/l)
09/20/02	FGL/OBL	860	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	0.69	-
09/27/02	FGL	935	560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/04/02	FGL	940	587	8.1	5.3	27	16	140	4	80	160	160	130	<0.4	<0.1	2	0.25	<0.01	0.18	0.01	-	-	<0.02
10/11/02	FGL	893	530	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/17/02	FGL	874	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/04/02	FGL/OBL	755	423	8.4	3.6	24	17	94	4	52	112	120	100	<0.4	<0.1	<2	0.19	<0.01	0.16	0.01	3.25	<0.4	<0.02
<b>Tranquillity ID Intake</b>																							
07/25/02	FGL	540	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/09/02	FGL	712	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/14/02	FGL	703	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/19/02	FGL	672	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/08/02	FGL	1570	925	8.0	12.2	23	6	255	5	90	296	250	200	<0.4	0.2	-	1.29	0.01	0.05	0.12	-	-	<0.02
09/20/02	FGL	1790	1080	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/27/02	FGL	2240	1390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/04/02	FGL	2370	1480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/11/02	FGL	2430	1510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/17/02	FGL	1,330	770	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02

1. Laboratory Abbreviations: BSK - BSK Analytical Laboratories, Fresno, CA; FGL - Fruit Growers Laboratory, Santa Paula, CA; USBR - U.S. Bureau of Reclamation, hydrolab field measurement; *OBL: Analyses by Olson Biochemistry Laboratories, Brookings, SD indicated by italics (Se and Mo Only).*

2. Electrical Conductivity at 25°C

3. HCO<sub>3</sub> reported as HCO<sub>3</sub>, total alkalinity reported as CaCO<sub>3</sub>, and NO<sub>3</sub> reported as NO<sub>3</sub>.

4. From 7/8/99 to 10/25/00 samples were collected at the MWA bridge located one mile south of Whites Bridge Road. From 11/18/00 to 8/15/01, samples were collected at Whites Bridge Road, with the exception of the 7/19/01 sample, which was collected one-quarter mile south of Whitesbridge Road. From 9/10/01 to the present, samples were again collected at the MWA bridge (one mile south of Whites Bridge Road).

**APPENDIX D**  
**MODEL DESCRIPTIONS**

## Table of Contents

	Page
D.1    Introduction .....	1
D.2    Groundwater Flow Models .....	2
D.3    Groundwater Quality Models .....	3
Conceptual Framework .....	3
Derivation of Equations .....	4
Hydraulic Gradients .....	7
Concentration Gradients .....	7
Model Calibration .....	8
Shallow Zone .....	8
Deep Zone .....	11
10-Year Simulation .....	12
D.4    Surface Water Mixing Models .....	13
Southern Fresno Slough Model .....	14
San Joaquin River Branch Model .....	15
References .....	16

### **Tables**

- D-1    Proposed Pumping Schedule for First Normal Year of 10-Year Project (2004)
- D-2    Parameters Used in Groundwater Flow Model Calibration
- D-3    Simulated TDS in Shallow MPG Wells (1999-2002)
- D-4    Simulated TDS in Deep Wells Near Fresno Slough (1999-2002)
- D-5    Simulated TDS in Shallow MPG Wells (2003-2012)
- D-6    Simulated TDS in Deep Wells Near Fresno Slough (2003-2012)
- D-7    Predicted TDS (mg/L) at Mendota Wildlife Area (2003-2012)

### **Figures**

- D-1    Flow Chart Showing Application of Groundwater and Surface Water Models
- D-2    Well Clusters Used for Shallow Zone Groundwater Quality Model
- D-3    Simulated and Measured TDS at Shallow Wells in Cluster S1 (North)
- D-4    Simulated and Measured TDS at Shallow Wells in Cluster S1 (South)
- D-5    Simulated and Measured TDS at Shallow Wells in Cluster S2
- D-6    Simulated and Measured TDS at Shallow Wells in Cluster S3
- D-7    Simulated and Measured TDS at Shallow Wells in Cluster S4
- D-8    Simulated and Measured TDS at Shallow Wells in Cluster S5
- D-9    Simulated and Measured TDS at Shallow Wells in Cluster S6
- D-10    Well Clusters Used for Deep Zone Groundwater Quality Model
- D-11    Simulated and Measured TDS at Deep Wells in Cluster D1
- D-12    Simulated and Measured TDS at Deep Wells in Cluster D2
- D-13    Simulated and Measured TDS at Deep Wells in Cluster D3
- D-14    Simulated and Measured TDS at Deep Wells in Cluster D4
- D-15    Simulated and Measured TDS at Deep Wells in Cluster D5

## D.1 INTRODUCTION

Potential impacts of the 10-year proposed project on groundwater levels and quality and surface water quality can be estimated using a modeling approach. Three models were developed using available data and used interactively to estimate the effects of the 10-year proposed project. The models are a groundwater flow model, groundwater quality model, and a surface water mixing model. Each of these models are discussed in detail below. The application of the models is summarized on the flow chart shown on Figure D-1. As shown on this chart, the modeling process starts with the development of a proposed Mendota Pool Group (MPG) pumping program for the first year of the project in which transfer pumping would occur. The well locations and monthly pumping rates for each well included in the pumping program are input into the groundwater flow models along with the estimated pumpage for each non-MPG well in the study area. The flow model calculates monthly drawdowns at each well in the simulation. This includes all MPG and non-MPG wells in the study area that are pumping during the simulation period. The simulated drawdowns are input into the groundwater quality model to determine the hydraulic gradient for flow of saline groundwater toward MPG and other wells near the Fresno Slough. The groundwater quality model calculates changes in total dissolved solids (TDS) at these wells on a monthly basis. The TDS calculated for each MPG well at the end of December is input into the surface water mixing model for the southern Fresno Slough. The mixing model calculates the monthly TDS at the Mendota Wildlife Area (MWA). This predicted TDS is compared against water quality targets for the MWA provided by the Department of Fish and Game. If the water quality targets are met, the pumping program is considered acceptable, and the process is repeated for the next year of the project. If water quality targets are not met, the pumping program is modified and the process repeated. This method was used to develop MPG pumping programs for the 10-year project that were predicted to meet surface water quality criteria.

The 10-year pumping program includes two wet years during which there would be no MPG transfer pumping, although MPG pumping for adjacent use would continue. Year 1 and Year 6 were simulated as wet years. The other eight years were simulated as normal years (maximum of 31,600 acre-feet of transfer pumpage). Transfer pumping greater than 31,600 acre-feet, as would be allowed in a dry year, was not simulated because the results of the surface water mixing model suggest that this level of pumping would not be possible without exceeding surface water quality criteria. This could change in the future if the actual salinity of the groundwater or the Delta-Mendota Canal (DMC) inflow are better than the assumptions used in the model. MPG pumping for adjacent use was assumed to be constant (14,000 acre-feet/year) during each of the ten years.

The proposed pumping program for Year 2 of the project, the first simulated “normal” year, is summarized on Table D-1. This table shows the capacity (pumping rate) and predicted TDS concentration for each MPG well at the beginning of the year. It also shows whether each well would be pumped during a given month, and whether the pumpage would be used for transfer or to irrigate adjacent lands. Well use is indicated with T, A, and T/A for transfer, adjacent and a combination of the two, respectively. A significant number of MPG wells (*italicized*) are not scheduled to pump due to high salinity or other factors. These wells were not simulated with the groundwater quality model. Similarly, deep wells east of the Fresno Slough are not included in the groundwater quality simulations because no water quality degradation has been observed at

these wells. This includes MPG wells owned by Farmers Water District (FWD), Baker Farming, and Panoche Creek Ranch. Note that Table D-1 does not show the non-MPG wells that are simulated with the groundwater flow and quality models.

## D.2 GROUNDWATER FLOW MODELS

Analytical groundwater flow models are used to estimate drawdowns caused by pumping in the Mendota area, including MPG transfer pumping. The model results are used to predict water level and subsidence impacts from proposed MPG pumping programs and to calculate the amount of compensation to be paid by the MPG to other well owners in the area for increased pumping costs. The models are also used to calculate drawdowns for the groundwater quality model discussed below.

The groundwater flow models simulate the monthly drawdown caused by pumping of all known agricultural and other large capacity wells within the study area, delineated by a 6-mile radius from the center of the MPG wells in FWD. Separate models were developed for the shallow aquifer above the A-clay and the deep aquifer below the A-clay. For the proposed project, the shallow zone model simulates pumpage from 52 MPG wells. No shallow non-MPG production wells are known to exist in the Mendota area. The deep zone model simulates pumpage from 16 MPG wells and 240 non-MPG wells.

The groundwater flow models that have been used for drawdown simulations since 2000 are based on the Hantush-Jacob (1955) equation, which calculates drawdown in a semi-confined (leaky) aquifer. The models are partially based on a computer program written by Walton (1985), which allows the Hantush-Jacob equation to be used to simulate drawdowns due to pumping of multiple wells. The models compute the drawdown for each pumping well using this equation and uses the principle of superposition to calculate a total drawdown for all wells at a specified time. These models have been used to simulate impacts of previous MPG transfer pumping programs (2000-2002) and have been found to be capable of predicting drawdowns with sufficient accuracy.

Model inputs include aquifer transmissivity, storativity, and leakage factor. The leakage factor ( $B$ ) is a function of the transmissivity ( $T$ ), the aquitard thickness ( $b'$ ), and the vertical hydraulic conductivity of the aquitard ( $K'$ ):

$$B = \sqrt{\frac{Tb'}{K'}} \quad (1)$$

The shallow zone model was calibrated against 1999 and 2000 water level data for shallow wells in the Mendota area. It uses a transmissivity of 220,000 gallons per day per foot (gpd/ft), a storage coefficient of 0.10, and a leakage factor of 25,000 feet (see Table D-2). The amount of vertical leakage simulated by the model is inversely proportional to the leakage factor. The relatively large leakage factor of 25,000 feet minimizes the amount of leakage as compared to the deep zone model, because there are no overlying saturated layers to provide leakage to the shallow zone. For the shallow zone model, the leakage factor was used primarily to simulate recharge to the shallow, unconfined aquifer resulting from seepage from surface water bodies and deep percolation of applied irrigation water and precipitation. The calibration of the shallow

zone model is discussed in depth in the 2000 annual report (*Mendota Pool Group Pumping and Monitoring Program: 2000 Annual Report* (LSCE and KDSA, 2001).

The deep zone model uses different parameters in the western and eastern portions of the study area due to greater aquifer confinement in the eastern area. The Fresno Slough and the San Joaquin River north of Mendota Dam are generally considered to define the dividing line between the western and eastern areas. The model used the same transmissivity (120,000 gpd/ft) for all areas. The model of the western area has a storage coefficient of 0.02 and leakage factors of 2,000 to 7,000 feet. The model of the eastern area uses a smaller storage coefficient (0.002), and larger leakage factors (5,000-10,500 feet). The model was calibrated against water level data between January 2000 and January 2002 for 38 deep wells in the MPG monitoring program. The calibration of the deep zone model is discussed in the 2001 annual report (LSCE and KDSA, 2002).

## D.3 GROUNDWATER QUALITY MODELS

### Conceptual Framework

Pumping is anticipated to increase groundwater quality degradation rates in the vicinity of the Mendota Pool. The magnitude of this change must be estimated to assess the potential impacts of the proposed project over the 10-year period. Salinity (as TDS) was used as an indicator of water quality because it is conservative, is readily measured, and sufficient data are available to conduct an analysis. The more limited data available for arsenic, boron, molybdenum, and selenium in groundwater preclude their use as indicators. The groundwater quality models calculate salinity changes measured as TDS concentrations in both shallow and deep wells near the Fresno Slough. They were developed to predict changes in groundwater quality that would occur with or without the 10-year MPG proposed project. The purpose of the models is to simulate long-term trends in salinity. No attempt was made to simulate the large seasonal fluctuations or other short-term TDS changes observed at some wells.

The conceptual framework of the models is primarily based upon two processes controlling water quality in the wells under investigation: (1) the horizontal flow of naturally occurring higher salinity groundwater from the west towards the Slough, and (2) seepage of better quality surface water from the Slough to the shallow zone or from the shallow to the deep zone. The former is induced by the regional hydraulic gradient, roughly to the east and northeast, and is accelerated by pumping in the Mendota area conducted by the MPG and other entities. The movement of higher salinity groundwater towards the Fresno Slough causes water quality degradation observed in a number of wells west of the Slough, and to a smaller degree in the shallow Coelho West wells just east of the Slough near Whites Bridge. The geographical distribution of salinity in the shallow and deep zones in 2001 is shown on EC contour maps (Figures 3-11 and 3-12, respectively) of the 2001 Annual Report (LSCE and KDSA, 2002). It appears from these contour maps that poor quality water is encroaching upon the Fresno Slough in the form of a wide saline front following the direction of the regional hydraulic gradient; i.e., the direction of the concentration gradients generally coincide with the regional water level gradients.

The models calculate the change in TDS in wells based on existing concentration gradients (estimated from the EC contour maps) and the differential changes of hydraulic head along the

direction of concentration gradient. The other major process simulated with the models is the seepage of surface water from the Slough, which counteracts water quality degradation due to movement of the saline front (primarily in the shallow zone). Surface water percolation from the Slough has been independent of the amount of pumpage since at least the late 1980s due to the presence of an unsaturated zone beneath the Slough.

Some shallow wells at the northern end of the Slough (Fordel M-2, M-3, and M-4 and Terra Linda TL-4C) appear to be impacted by wastewater from the City of Mendota sewage treatment ponds and Fresno County waste disposal site. In addition, three of the five Coelho West wells (CW-3, CW-4, and CW-5) are apparently impacted by high salinity groundwater originating from wastewater ponds and wastewater-irrigated pasture on the Spreckels Sugar Co. property. These additional sources of salinity are accounted for in the water quality model for the shallow zone based on the assumption that their impact and that of the saline front are additive. The discussion of the groundwater quality model provided below includes the following sections: 1) Derivation of Equations, 2) Hydraulic Gradients, 3) Concentration Gradients, 4) Model Calibration, and 5) 10-Year Simulation.

### **Derivation of Equations**

The development of the equations used in the groundwater quality models is summarized below. The general equation for solute transport in groundwater calculates movement of a solute by advection with retardation due primarily to sorption as described by a linear isotherm (Domenico and Schwartz, 1998):

$$v_c = \frac{v_w}{R} \quad (2)$$

$v_c$  = velocity of solute

$v_w$  = pore water velocity

$R$  = retardation factor

For conservative (non-reactive) constituents such as salts, retardation is generally not a significant factor. Therefore, R is assumed equal to one ( $v_c = v_w$ ). Combining this with Darcy's equation (Darcy, 1856) and the average pore water velocity:

$$\begin{aligned} v_d &= Ki \\ v_w &= \frac{v_d}{n} \\ \text{yields: } v_c &= \frac{Ki}{n} \end{aligned} \quad (3)$$

$v_d$  = Darcy velocity of groundwater

$n$  = porosity of aquifer material

$K$  = hydraulic conductivity

$i$  = hydraulic gradient

Using the definition of transmissivity ( $T = Kb$ ),  $K = T/b$ ; substitution in (2) yields:

$$v_c = \frac{Ti}{nb} \quad (4)$$

$T$  = transmissivity of the aquifer

$b$  = thickness of aquifer

Multiplication by time yields the distance traveled by the solute:

$$d_{vc} = v_c t = \frac{Ti}{nb} t \quad (5)$$

$d_{vc}$  = distance traveled during time  $t$

Multiplication by the concentration gradient yields the change in salinity measured as TDS:

$$TDS_{change} = \frac{Ti}{nb} t C \quad (6)$$

$TDS_{change}$  = change in TDS during time  $t$

$C$  = concentration gradient

$$\text{where: } C = \frac{TDS_{source} - TDS_{well(t_0)}}{L} \quad (7)$$

$TDS_{source}$  = TDS at upgradient location (assumed to be constant)

$TDS_{well(t_0)}$  = initial TDS at well at beginning of simulation

$L$  = distance between well and source location

Addition of  $TDS_{change}$  and the initial TDS yields the new TDS at the well.

$$TDS_{well} = TDS_{well(t_0)} + \frac{TDS_{source} - TDS_{well(t_0)}}{L} t T \frac{i}{nb} \quad (8)$$

The TDS at the downgradient well is calculated for successive months, where each month is denoted by  $p = 1, 2, 3, \dots, k$  ( $k$  = # of months).

Thus, the equation takes the general form

$$TDS_{well(p)} = TDS_{well(p-1)} + \frac{TDS_{source} - TDS_{well(t_0)}}{L} tT \frac{i}{nb} \quad (9)$$

$TDS_{well(p)}$  = TDS at well for the p<sup>th</sup> month

$TDS_{well(p-1)}$  = TDS at well for the preceding month  
(equal to  $TDS_{well(t_0)}$  for the first month)

Seasonally collected data from a number of wells indicate that water quality improves during times of minimal extraction in the winter months, especially in the shallow zone. This suggests that dilution of the saline groundwater flowing from upgradient areas is occurring, due to two primary factors:

- 1) Good quality surface water percolates from the Fresno Slough to the shallow aquifer, resulting in groundwater quality improvement. Similarly, there is some vertical flow of groundwater from the shallow to the deep zone. Near the Slough, this water is lower in salinity than the deep zone groundwater and has a beneficial effect on water quality.
- 2) Groundwater flows to the cone of depression created by pumping wells from all directions. Therefore, the higher salinity groundwater flowing from the upgradient (westerly) direction is partially offset by better quality water flowing into the cone of depression from cross-gradient and downgradient directions.

Since vertical seepage is considered to be the primary factor in groundwater quality improvements near the Slough, terms used to simulate these processes are labeled “seepage factors” in the models. An incremental seepage factor acts upon the calculated monthly TDS increment, and thus controls the amplitude of the seasonal fluctuations. An overall seepage factor acts on the sum of the TDS increment and the TDS of the previous month, i.e. the simulated TDS in the well, and thus controls the overall degradation rate. For both seepage factors, smaller values simulate more dilution, and a value of one indicates no dilution. Both the incremental term and the overall equation are multiplied by seepage factors to yield:

$$TDS_{well(p)} = \left[ TDS_{well(p-1)} + \left( \frac{TDS_{source} - TDS_{well(t_0)}}{L} tT \frac{i}{n * b} \right) S_{inc} \right] S_{oa} \quad (10)$$

$S_{inc}$  = incremental seepage factor (acts on the monthly calculated change in TDS). This factor controls the seasonal and year-to-year fluctuations in TDS concentrations.

$S_{oa}$  = overall seepage factor (acts on the monthly calculated total TDS). This factor controls the overall degradation rate.

Units of variables used in the final equation:

$$TDS = \text{mg/L}$$

$$L = \text{ft}$$

$$t = \text{days}$$

$$T = \text{ft}^2/\text{day} (\text{gal/day}/\text{ft} \text{ multiplied by conversion factor } 0.134 \text{ ft}^3/\text{gal})$$

$$i = \text{ft}/\text{ft}$$

$$n = \text{ft}^3/\text{ft}^3$$

$$b = \text{ft}$$

## Hydraulic Gradients

Groundwater moves in a northeasterly direction towards the Fresno Slough due to the regional hydraulic gradient, which is caused by regional (rather than local) pumping activities and other factors that affect regional groundwater conditions. The effects of deep-zone pumping in western Madera County is a major factor influencing the regional gradient in the Mendota area. The magnitude and direction of the regional gradient was estimated with the aid of groundwater elevation contour maps of the winter months prepared for the 2000 and 2001 annual reports (LSCE and KDSA 2001 and 2002). The dates of these contour maps are December 1999, December 2000/January 2001, and January 2002 (shallow zone) and December 1999, January 2001 and January 2002 (deep zone). The effect of the regional gradient is most obvious during the winter months, when groundwater extraction is minimal and localized recovery of water levels after the irrigation season has occurred. The magnitude of the regional gradient west of the Fresno Slough was estimated to be about 0.0015 ft/ft for the shallow zone and 0.0024 ft/ft for the deep zone based on the contour maps. The magnitude and direction of the regional gradient was assumed to be constant for all simulations.

To estimate the hydraulic gradient at individual wells, initial differences in hydraulic head between each well and an upgradient reference location were determined. Reference locations were selected along an upgradient contour line such that they aligned with the direction of the regional gradient. The initial differences in groundwater elevations in January 1999 were calculated by applying the regional gradient over the distance between wells and their respective reference locations. This was necessary because measured water level data were only available for a small subset of the calibration wells. The groundwater quality models incorporate changes in hydraulic head based on monthly drawdowns calculated using the groundwater flow models. These are used to predict changes in the hydraulic gradient caused by pumping, which are added to the regional gradient to determine the total gradient for groundwater flow. The generally easterly flow of saline groundwater is modeled along the direction of these gradients.

## Concentration Gradients

The wells simulated with the groundwater quality models were divided into clusters for calibration purposes, and similar model parameters were used for the wells within each cluster. Water quality contour maps were used in conjunction with the water quality data from individual wells to calculate initial (1999) concentration gradients for each well. An average concentration gradient was estimated and applied to all wells in a given cluster. The calculated concentration gradients can be highly variable, because even nearby wells often have very different water

quality. The phenomenon of the high variability of salinity among nearby wells is generally explained by the location of the wells relative to the saline front and the amount of surface water recharge in the vicinity of the well. The recharge is primarily related to the depth of the wells and their proximity to the Fresno Slough, although geologic conditions are also a factor. Shallow wells in the southern half of the MPG well field exhibit the most variability. For example, samples collected on October 17, 2002 from CGH-6B and CGH-6D showed TDS concentrations ranging from 2,110 mg/L to 1,160 mg/L, respectively. These wells are aligned in an east-west direction and are only about 200 feet apart.

To calculate concentration gradients for the shallow zone, a 1999 TDS concentration contour map was generated based on a combination of measured data and estimated values. Deep zone concentration gradients were based on a 1999 EC contour map prepared for the Phase I report (KDSA and LSCE, 2000a) and the 2001 EC contour map shown on Figure 3-12. The EC values on these maps were converted to TDS using a linear regression equation. The general lack of water quality data upgradient (west) of the MPG wells along the Slough makes water quality contours in that area somewhat speculative, and there is considerable uncertainty attached to the estimated concentration gradients.

## **Model Calibration**

The approach to model calibration was constrained by the availability of data of sufficient duration. The focus of the calibration was on prediction of long-term water quality trends rather than short-term fluctuations. The models were calibrated against observed TDS data from January 1999 through October 2002. The model for the shallow zone was calibrated using data from MPG wells only, because these are the only shallow production wells in the model area. As discussed above, data from upgradient shallow monitoring wells were used to determine the concentration gradients. The model for the deep zone was calibrated using data from CCID wells, City of Mendota wells, and the Mendota Biomass well, in addition to the MPG wells. Multiple water quality samples were available for a number of deep wells during the calibration period, but only a few shallow wells had sufficient data to be used as calibration wells. This problem is compounded by the fact that some shallow MPG wells have been abandoned since 1999, and others have been drilled as recently as 2002. As a result, initial (1999) TDS concentrations for many wells had to be estimated either on the basis of available data from nearby wells of similar depths, or extrapolated using observed data for a shorter period (one or two years), along with estimated degradation rates. Although some wells were not included in the 10-year pumping plan due to poor water quality, they were used as calibration wells due to the availability of historical data. Some wells were included in the model calibration even though they were drilled after 1999. For these cases, the 1999 TDS concentrations were based on water quality estimates for a particular location and depth, rather than data from a specific well. As further discussed below, almost all shallow and deep wells used to calibrate the models showed water quality degradation during the calibration period.

### Shallow Zone

The well locations and clustering used for calibration of the shallow zone model are shown on Figure D-2. The calibration parameters, annual TDS changes calculated for December 1999 through December 2002, and the mean degradation rates are summarized on Table D-3. As

mentioned above, concentration gradients were applied uniformly within each cluster of wells. Concentrations gradients estimated for shallow wells range from 0.15 to 0.92 mg/L/ft. They generally increase from north to south and were found to be the highest in the vicinity of the wells in the central and southern portion of the MPG well field. Seepage factors were generally held constant within clusters; however, some adjustments were made as necessary, particularly in areas where large TDS differences occur in wells of close proximity.

The focus of the calibration was on simulation of the overall salinity trend that was observed during the 1999-2002 period. No attempt was made to simulate the sudden TDS changes or large seasonal fluctuations observed at some wells. These may be caused by seasonal factors, the amount of time that the well had been pumping prior to collecting the samples, or the laboratory that analyzed the results. In many cases a compromise had to be found such that the selected parameters generated degradation rates that could reasonably approximate the most recent sample results. For example, Terra Linda wells TL-4C and TL-17 experienced a much larger increase in TDS between June 2001 and June 2002 than other wells in this cluster, which the model did not adequately simulate. Matching of both the 2001 and 2002 sample results could only have been achieved by drastically changing the calibration parameters including the use of an unrealistically low initial TDS. The simulated TDS values are thus to be viewed as averages representing long-term trends. Due to the lack of data and greater variability for the shallow wells, there is more uncertainty in the calibration for the shallow zone than for the deep zone. Overall, the calibration was considered acceptable for predicting salinity changes during the 10-year proposed project.

The shallow-zone calibration is shown on Figures D-3 through D-9. On these plots, the same color code was used for sample data (symbols) and modeled TDS concentrations (solid lines) for each well. Figures D-3 and D-4 show the calibration for cluster S1, which includes the Fordel wells and the northernmost Terra Linda wells. The lack of historical data is very apparent on these figures; only two wells in this cluster (Fordel M-2 and Terra Linda TL-4A) were sampled in 1999. For wells without 1999 data, a decision regarding the starting concentration was made as part of the calibration process. Because well TL-4A does not yet appear to be impacted by wastewater from the City of Mendota sewage treatment plant or the Fresno County disposal site, it is believed to be more representative of water quality degradation due to movement of the saline front and was used as the primary calibration well for this cluster. Similar calibration parameters were used for other wells in the cluster (M-5 and M-6 have slightly smaller incremental seepage factors), and different starting concentrations were estimated for each well. The concentration plots illustrate slightly higher degradation rates in the summer months, when pumping activity is high, and reduced water quality degradation (or, in the case of Fordel M-2, even slight water quality improvement) in the winter, when extraction is minimal. For Fordel M-2, emphasis was placed on matching the most recent data points and the apparent degradation rate in 2001-2002, which could only be achieved by disregarding some of the earlier data. Fordel wells M-3 and M-6 experienced some short-term water quality improvements between June and October 2001. A later sample (June 2002) revealed that this trend has not continued at well M-6. Since there is no reason to expect continued water quality improvements in well M-3, it was modeled similarly to other wells in the cluster.

The comparison of complete water quality analyses from monitoring wells near the City of Mendota sewage ponds and the Fresno County disposal site with water quality at MPG wells

indicates that four MPG wells have been impacted by saline wastewater from these facilities: Fordel M-2, M-3, and M-4 and Terra Linda TL-4C. These wells have significantly higher measured TDS concentrations than other wells in the cluster (Figure D-3) and have slightly higher degradation rates than other nearby wells (Table D-3). However, they are not the most westerly wells, as would be expected if the saline front was the only source of poor quality water. Water quality changes in these wells were modeled as the sum of the effect of the saline front and the influence of percolated wastewater. The most recent data from TL-17 indicate that it may also be impacted by wastewater, but this was not simulated with the model.

Figure D-4 shows the calibration plots of four Terra Linda wells, also in cluster S1, which have no 1999 or 2000 data. One of these wells (TL-10C) showed water quality improvement between 2001 and 2002, but it was assumed that degradation would occur at this well over the long term. Calibration parameters for these wells were based primarily on the wells plotted on Figure D-3.

Figure D-5 shows calibration plots of three Terra Linda wells (TL-13, 14, and 15) in cluster S2, all of which were constructed in 2001. Degradation has occurred at one of these wells (TL-14) since it was first sampled in July 2001. Calibration parameters for these wells were similar to those used for cluster S1.

Calibration plots of the wells in cluster S3 in the Central Fresno Slough group are shown on Figure D-6. This cluster includes one Terra Linda well (TL-12), two Silver Creek wells (SC-3B and 4B), and five CGH wells or well clusters (CGH –1, 2, 6, 9, and 10). The northernmost wells in this cluster (SC-3B and 4B and TL-12) have the best water quality but limited data because they were not drilled until 2000 (TL-12) or 2002 (SC-3B and CS-4B). These wells were modeled using the same calibration parameters as the CGH wells, which have more water quality data.

The CGH-1 cluster includes three individual wells (CGH-1A, CGH-B, and CGH-C) connected to a common introduction point. These were modeled as one well, because only composite samples were taken at the introduction point in 1999 and 2000 (round symbols). Individual sampling of the wells did not start until June 2001, when CGH-1C (diamond symbols) was initially sampled, and CGH-1A and CGH-1B (square and triangular symbols, respectively) were not sampled until 2002. CGH-6C and CGH-6D (round and square marker, respectively) were also modeled as one well for similar reasons. CGH-6A and CGH-6B have been removed from the pumping program due to poor water quality and are not shown on Figure D-6.

CGH-9 and CGH-10 were drilled in November 2000 but were not used until early summer of 2001. Data from these wells showed a TDS increase of more than 200 mg/L during the first few months of pumping, but degradation slowed considerably during the following year. For these and other wells, priority was given to matching the most recent water quality data. Figure D-6 also illustrates another source of uncertainty not related to modeling, which was highlighted in 2002 when split samples were sent to three different laboratories: reported TDS concentrations in October 2002 differed by as much as 100 mg/L for split samples from CGH-2 and 10 that were analyzed by different laboratories. Overall, the wells in this cluster required the most adjustments to the overall seepage factor, which ranged from 0.966 at TL-12 (the well with the lowest TDS in the cluster) to 0.990 at CGH-2 (the well with the highest TDS).

Figure D-7 shows three shallow Meyers Farming wells in cluster S4. MS-3 is the only well with water quality data in 1999 and served as the primary calibration well, even though it is no longer part of the pumping program. MS-6 and 7 were completed in May and June 2002, but MS-6 has been abandoned due to its elevated TDS.

Figure D-8 shows the calibration of the ten Five Star wells in cluster S5. The discharge of these wells is combined into one introduction point, but the wells are modeled separately because the water quality is quite variable and each of the individual wells were sampled in 2001. Water quality in these wells ranged from 590 mg/L in FS-1 to 1,600 mg/L in FS-7. FS-5 is the only well in this cluster that was sampled in 1999; it was used as the primary calibration well.

The calibration of the Coelho West wells (cluster S6) is shown on Figure D-9. The comparison of water quality data from nearby Spreckels Sugar Co. monitoring well MW-1 with water quality from the Coelho West wells indicates that CW-3, CW-4, and CW-5 are impacted by wastewater used to irrigate permanent pasture in the western portion of the Spreckels' property. Samples from CW-5, the well closest to Spreckels MW-1, had the highest TDS concentrations in this cluster. TDS concentrations measured in the southernmost wells (CW-1 and CW-2) were lower and are probably indicative of water quality that would be expected in this area without the influence of Spreckels' wastewater.

All samples collected from the Coelho West wells in 2002 had lower TDS concentrations than samples collected in 2001, especially at wells CW-4 and CW-5. This variability is probably not due to any long-term water quality improvements in this area. The fall 2002 sample from CW-5 had a much higher TDS concentration (similar to the fall 2001 sample). Such large fluctuations are poorly understood, and no attempt was made to simulate them with the water quality model. The impact of the saline front is relatively small in this cluster due to its location on the eastern side of the Fresno Slough. Water quality changes in CW-3, CW-4, and CW-5 were modeled as the sum of the effect of the saline front and the influence from Spreckels Sugar Co. wastewater.

### Deep Zone

The well locations and clustering used for calibration of the deep-zone model are shown on Figure D-10. The deep-zone calibration for individual wells is shown on Figures D-11 through D-15. In general, considerably more data were available for deep zone wells, reducing the uncertainty associated with the calibrated model parameters. Water quality data for the deep zone indicates that salinity in this zone generally increases at a more constant rate. Seasonal fluctuations and other short-term changes are much less apparent in the data. Concentration gradients estimated for deep wells exhibit less variability and range from 0.4 to 0.56 mg/L/ft (Table D-4) indicating a more uniform advance of the saline front than in the shallow zone. Less influence from good quality recharge (in this case from the shallow zone) is reflected by larger incremental seepage factors (0.3 to 0.59 for the deep zone compared to 0.16 to 0.29 for the shallow zone). The minimum overall seepage factor for the deep zone (0.995) equals the maximum overall seepage factor used in the shallow zone.

Figure D-11 shows the calibration graphs of non-MPG wells north of the City Mendota (cluster D1). Relatively frequent data are available for City of Mendota wells No. 3 and No. 5. Fewer data were available for City of Mendota well No. 4 and the CCID wells, but all wells had 1999

sample results. Unlike most of the MPG wells, these wells all have water quality data prior to 1999. The historical data generally show higher degradation rates during the late 1980s and early 1990s, followed by a leveling off after 1995. Only the 1999 through 2002 data are used for calibration purposes because the recent degradation rates are considered to be more representative of degradation rates that would be likely to occur in the future.

Calibration plots for the deep MPG wells in the northern portion of the Pool (cluster D2) are shown on Figure D-12. Fordel M-1 and Terra Linda well TL-3 had 1999, 2000, and 2001 data and were used as the primary calibration wells in this cluster. TL-2 had only one measured TDS value in 2000, and the same calibration parameters used for TL-1 were also assigned to TL-2

Figure D-13 shows the calibration plot for cluster D3, which includes two Terra Linda wells (TL-8 and TL-9), the Conejo West well, and CCF-1. TL-8 had the most complete data, with at least one sample from each year of the calibration period, and was used as the primary calibration well. Data from this well indicate a relatively linear rate of degradation during this period.

Figure D-14 shows the calibration plot for cluster D4, which includes two Terra Linda wells (TL-5 and TL-7), in the central portion of the MPG well field and the Mendota Biomass well. Well TL-7 and the Mendota Biomass well had data from each year of the calibration period, and TL-5 had data for every year except 2002. The 1999-2002 data from TL-7 and the 2000-2002 data from the Mendota Biomass well indicate a relatively linear rate of degradation.

Figure D-15 shows the calibration plot for cluster D5, which includes deep wells in the southern half of the MPG well field (SC-5, CGH-7, and MS-5). The calibration of CGH-7, which has only been sampled twice, was partly based on data from SC-5. A total of 15 samples (the most for any MPG well) was available for MS-5. This well shows some seasonal fluctuations, but the overall degradation rate is also relatively linear.

## 10-Year Simulation

The groundwater quality models were used to simulate the 10-year period of the proposed project from (January 2003 to December 2012). The starting concentrations for the 10-year model run were based on simulated concentrations at the end of the calibration period (December 2002). Annual summaries of simulation results for shallow and deep wells is provided in Tables D-5 and D-6, respectively. Simulated TDS concentrations are listed for each well at the end of each year of the project. Also shown are the initial concentrations and the average annual degradation rates. Note that some wells used to calibrate the models are not shown on these tables because they have been abandoned or are not included in the MPG 10-year pumping program due to poor water quality.

The model results for shallow wells indicate that the salinity in all wells is predicted to increase non-linearly during the 10-year period. During wet years, the degradation rate would decrease considerably, and in some cases result in water quality improvements. The degree of water quality improvement during wet years is primarily due to the amount of seepage from the Slough, which is controlled by the seepage factors in the model. The predicted water quality improvements during wet years are greatest at shallow wells owned by Silver Creek, CGH, and Five Star. Meyers well MS-7 also shows significant water quality improvement in wet years.

According to the model results, MS-7 would exceed the 2,000 mg/L limit in Year 5 of the 10-year project, and thus would be removed from the pumping program. Removal of MS-7 from the transfer pumping program results in a decreased rate of degradation during the second half of the project. Results for most other shallow wells also indicate that the degradation rate would decrease slightly toward the end of the simulation period as pumpage reductions occur and the salinity in some wells approaches that of the upgradient source.

An annual summary of simulation results for shallow wells is provided in Table D-5. A comparison between the predicted average annual degradation rates and those calculated for the calibration phase (Table D-3) shows that the future degradation rate for well clusters S3 through S6 is predicted to be significantly less than was estimated during the calibration period. This is primarily the result of planned pumping reductions in the southern half of the MPG well field and the effect of suspending transfer pumping during the wet years.

The results of the 10-year simulation for the deep zone are summarized in Table D-6. The predicted rates of water quality degradation in the deep zone are much more linear than in the shallow zone. Degradation rates decrease only slightly during wet years, and no water quality improvements are predicted, because the amount of seepage from the Slough is insufficient to counteract water quality degradation caused by movement of the saline front. Deep zone pumpage along the Fresno Slough would be only slightly less during wet years, because most deep wells in this area are pumped for adjacent use rather than transfer. The total proposed volume of deep zone pumpage during normal years is much less than the shallow zone pumpage, and the majority of the deep zone pumpage would occur in FWD wells. Deep zone pumpage during normal years does not change during the 10-year simulation, because planned pumping reductions made to meet water quality targets would occur from shallow wells. Degradation rates predicted for the deep zone are generally higher than for the shallow zone and are much less dependent on MPG and other local pumpage, because the regional gradient in the deep zone is steeper and is responsible for much more of the movement of the saline front (see Table 4-3). The predicted deep zone degradation rates during the 10-year project (Table D-6) are more similar to degradation rates calculated during the calibration period (Table D-4).

#### D.4 SURFACE WATER MIXING MODELS

Two surface water mixing models were developed, one for the southern portion of the Fresno Slough and one for the San Joaquin River branch of the Pool. The models are used to predict concentrations of chemical constituents in the Pool at the MWA and at Mendota Dam (southern and northern mixing models, respectively). The models are used primarily to estimate salinity (as TDS) but have also been used to estimate boron concentrations. These models do not require calibration since they merely blend water of varying quality and quantity using flow averaging. Implicit in this approach is the assumption of instantaneous and complete mixing. The flow volumes used in the models are based on water demands (outflows) calculated from the water budget, which is discussed in Section 3.3.1 and the 2000 and 2001 annual reports (LSCE and KDSA 2001 and 2002). The inflows and outflows used for the water budget are tracked on a daily basis by SLDMWA.

The models do not account for evaporation and seepage losses. Inclusion of these variables would make the models less conservative by adding to the net demand, which would result in a

larger DMC contribution to the volume of water available for mixing. Since there is no meaningful way to predict stage changes in the Pool, variations in monthly inflow due to storage change were also omitted from the models.

### Southern Fresno Slough Model

The model for the southern portion of the Fresno Slough calculates average monthly concentrations in the Fresno Slough at the MWA south of Whitesbridge Road. Flow volumes are based on a simplified monthly water budget that calculates the monthly net water demand in the southern portion of the Slough. This demand is based on diversions by the MWA, James and Tranquillity Irrigation Districts, Westlands and Fresno Slough Water Districts, and several smaller users. This demand is mostly met by inflow from the DMC, and to a much smaller degree by MPG pumpage for transfer and adjacent use. The portion of the DMC inflow that flows south to the MWA is calculated as the difference between the net demand at the south and the inflow from MPG wells along the Slough. Therefore, a southerly flow direction is implicit in the calculations. The quantity and quality of MPG pumpage into the Slough is accounted for on a well-by-well basis using the most recent well capacities and measured or predicted water quality.

Application of the model requires assumptions regarding the net demand in the southern portion of the Slough, the water quality of DMC inflow, and the changing water quality of MPG wells. The monthly demand was based on averages between January 1999 and July 2002 calculated from the water budget, excluding months when the Mendota Pool was drained. The water quality of the DMC inflow is based on the daily EC measurements made at the DMC terminus from January 1993 through October 2002. This period was selected because: 1) implementation of the CVPIA, which began in 1993, has resulted in major changes in the quantity and quality of the DMC inflow; and 2) measurement of EC at Bass Avenue near the DMC terminus (Check 21) began in January 1993. Earlier DMC water quality data are from Check 20, located 6 miles upstream.

The 10-year record of the daily average EC at the DMC terminus was used to calculate monthly average EC values, which were subsequently converted to TDS using a linear regression equation based on 2000-2001 surface water grab sample data:  $TDS = 0.6426*EC - 14.46$ , with  $n = 108$ . Boron data for the DMC are obtained from grab samples collected by the MPG from June through November 2002. These concentrations ranged from 0.13 to 0.24 mg/L. The January through May concentrations were based on the average of the June and November results (0.17 mg/L).

The effect of MPG pumpage on boron concentrations at the MWA is discussed in Section 4.4.1.5. In general, boron concentrations in the MPG wells along the Fresno Slough are low, but on average are slightly higher than the concentrations in the DMC inflow. The model results indicate that under the proposed project MPG transfer pumpage in 2004 would result in an average boron concentration increase of 0.04 mg/L at the MWA during the months that the pumpage would occur (Table 4-5). Since the effect of MPG pumpage on boron concentrations at the MWA is presently very small, no ten year simulations were conducted.

To check the accuracy of the mixing model, TDS results for 2001 and 2002 were compared against grab sample data collected from the MWA during those years. The model results

corresponded reasonably well to observed concentrations for both years. The 2001 comparison is discussed in the 2002 EA (Reclamation 2002).

After each year of the 10-year period, the simulated monthly water quality at the MWA was checked, and adjustments to the pumping program were made as necessary to prevent exceedance of water quality targets. Compliance was achieved by reducing transfer pumpage and, to a smaller degree, by redistributing pumpage for adjacent use. During the summer months, demand at the south is sufficiently high that most MPG wells would be able to pump without causing water quality impacts. Pumpage reductions were necessary during the spring and fall, because the relative impact of MPG pumpage increases when the net demand is low. Transfer pumpage had to be reduced in the months of March and April beginning in year five to prevent predicted TDS concentrations in excess of 600 mg/L. The TDS target of 450 mg/L during the fall period (September, October and November) was the most difficult to meet, and the largest transfer pumping reductions were necessary in these months. The impact of the proposed project on the water quality at the MWA is summarized on Table D-7. Model results indicate that the predicted TDS concentrations will not exceed 450 mg/L during the fall or 600 mg/L in any month. The annual TDS ranged from 376 to 475 mg/L for the 10-year period. The mean annual TDS for the period is 447 mg/L.

### **San Joaquin River Branch Model**

The model for the San Joaquin River branch of the Pool calculates TDS and boron concentrations at Mendota Dam based on a simplified water budget for the area north and east of the CCID Main Canal. Flow volumes are based on the monthly net water demand in this portion of the Pool. Flow over the Dam to the lower San Joaquin River constitutes by far the largest outflow component. Smaller outflow components are diversions to the Columbia Canal and NLF. These demands are primarily met by inflow from the DMC, with much smaller components from the MPG wells and the San Joaquin River. The San Joaquin River inflow which has varied greatly in recent years, as discussed below.

The net demand (difference between the total outflows and the San Joaquin River inflow) is primarily met by inflow from the DMC, and to a much smaller degree by MPG transfer pumpage. The DMC contribution is calculated as the difference between the net demand at the north, and the inflow from MPG wells in FWD.

Magnitudes of outflow past Mendota Dam, to the Columbia Canal and NLF are average values based on monthly 1999-2002 data (excluding months when the Pool was drained). Inflow from the San Joaquin River depends mainly on reservoir operations at Friant Dam and varies greatly from year to year. For example, 1999 and 2000 summer releases from Friant Dam to restore riparian habitat along the San Joaquin River resulted in flow in this reach of the River during most of the irrigation season and a westerly flow direction in this branch of the Pool. In contrast, flow to the Pool from the San Joaquin River was minimal in 2001 and 2002. Therefore, two scenarios (one for moderate and one for low flow conditions of the San Joaquin River) were simulated.

The estimation of water quality of the DMC is based on the same assumptions as the southern mixing model. Water quality of the San Joaquin River was estimated based on grab sample

analyses from the Columbia Canal intake collected during times of significant inflow from the River.

The model incorporates individual pumpage and TDS or boron contributions from the MPG wells in FWD. Wells in FWD use the Pool to convey water for transfer purposes only. Water for adjacent uses does not enter the Pool. Therefore, there is no potential during wet years, and the water quality was not simulated with the model.

The mixing model results for the San Joaquin River branch of the Pool indicate that MPG transfer pumpage would have virtually no effect on TDS and boron concentrations in this area (Tables 4-6 and 4-7). This is primarily due to the fact that the water quality of the FWD wells is generally similar to that of the DMC. Furthermore, the volume of water introduced by the MPG (about 10,000 af) constitutes less than 5 percent of the total volume of water conveyed through this portion of the Pool. Because water quality degradation has not been observed in samples from the FWD wells, the predicted TDS concentrations are assumed to be constant during the remainder of the 10-year proposed project. Further discussion is provided in Section 4.4.1.5.

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**APPENDIX E**  
**COST OF WATER CALCULATIONS**

**Table E-1. PROPOSED ACTION**

		Pumping Costs (per af)		
<b>Cost Estimation</b>				
Groundwater extraction costs		\$ 38.63		
Reclamation charges		\$ 6.50		
SLDMWA charges		\$ 15.00		
Westland Water District Charges		\$ 12.00		
Monitoring, Instrumentation, and reporting		\$ 10.50		
Environmental documentation and permits		\$ 1.75		
Other expenses		\$ 1.20		
<b>Total cost per acre - foot</b>		<b>\$ 85.58</b>		
		Total		
		Pumping	Exchange	Local
		# years	(af)	w/ USBR (af)
Normal year		6	31600	25000
Dry year		2	40000	25000
Wet year		2	0	0
<b>Total cost over 10 years : \$19,804,648.00</b>				
<b>Total cost per af exchanged: \$ 99.02</b> (= Total cost over 10 years/200,000)				

**Table E-2 NEW WELL CONSTRUCTION**

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<i>Number of wells needed:</i>	75																																
<b>One time costs:</b>																																	
<i>Well Cost:</i>	\$250,000																																
<i>Loan taken - Number of years:</i>	15																																
<i>Interest (%):</i>	0.06																																
<i>Monthly Payment:</i>	\$2,109.64																																
<b>Total Well Cost:</b>	<b>\$379,735.57</b>																																
<b>Infrastructure Costs:</b>	- <i>Cost Piping (\$/ft):</i> \$ 40.00 - <i>Pipe needed (ft):</i> 297000 =1.5 miles * 75 wells <b>Total Infrastructure cost:</b> \$ 11,880,000.00																																
<b>Pumping Cost per af:</b>																																	
Groundwater extraction costs	\$ 50.00																																
Reclamation charges	\$ -																																
SLDMWA charges	\$ -																																
EIS Preparation	\$ 1.75																																
Westland Water District Charges	\$ 12.00																																
Other expenses	\$ 1.20																																
<b>Total Pumping Costs per af:</b>	<b>\$ 64.95</b>																																
<b>Boosting Cost per af:</b>																																	
Boosting Rate:	\$ 14.00																																
Acre-feet boosted:	\$ 8,333.33																																
<b>Boosting Cost per af:</b>	<b>\$ 4.67</b>																																
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">POOL</th> <th rowspan="2"># years</th> <th rowspan="2">Total Pumping (af)</th> <th colspan="2">Exchange</th> </tr> <tr> <th>w/ USBR (af)</th> <th>Local Exchange</th> </tr> </thead> <tbody> <tr> <td>Normal year</td> <td>6</td> <td>9,000</td> <td>0</td> <td>9,000</td> </tr> <tr> <td>Dry year</td> <td>2</td> <td>9,000</td> <td>0</td> <td>9,000</td> </tr> <tr> <td>Wet year</td> <td>2</td> <td>9,000</td> <td>0</td> <td>9,000</td> </tr> <tr> <td></td> <td>Pumping</td> <td>25,000</td> <td></td> <td></td> </tr> <tr> <td>GW Extr costs (Pool Wells):</td> <td>\$</td> <td><b>38.63</b></td> <td></td> <td></td> </tr> </tbody> </table>		POOL	# years	Total Pumping (af)	Exchange		w/ USBR (af)	Local Exchange	Normal year	6	9,000	0	9,000	Dry year	2	9,000	0	9,000	Wet year	2	9,000	0	9,000		Pumping	25,000			GW Extr costs (Pool Wells):	\$	<b>38.63</b>		
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<b>Total cost over 10 years:</b>	<b>\$ 57,760,201.28</b> =# Wells*Cost+ <i>Infr Costs</i> +(Boosting/Pumping Costs)*200,000+(GW Extr costs)*10*9,000																																
<b>Total cost per af exchanged:</b>	<b>\$ 289</b> (= Total cost over 10 years/(8*25,000))																																

**Table E-3 LAND FOLLOWING**

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Crop Value (/acre /year)	\$	2,003
Water required (af per acre per year)		2.5
Number of acres for 1 employee		90
Minimum Wage (per hour)	\$	6.75
Annual wage	\$	14,040.00 (=Min wage *2080)
EIS Preparation: Cost for 10 years:	\$	350,000.00
Other Expenses (per af):	\$	1.20

	# years	Acres Fallowed	Employees Reduction	Total Pumping (af)	Exchange w/ USBR (af)	Local Exchange
Normal year	6	10000.00	111	9,000	0	9,000
Dry year	2	10000.00	111	9,000	0	9,000
Wet year	2	0	0	9,000	0	9,000
Pumping	8	0	0	25,000		

Total Crop Loss for 10 years : \$ **160,278,089.20** =8\*10,000 \*Crop Value

Total Labor Loss for 10 years: \$12,480,000.00 =8\*111 \* Annual Wages

Crop Loss (per af of water) \$ 801.39 =Crop Loss / (8\*25,000)

Labor Loss (per af of water) \$ 62.40 = Labor Loss / (8\*25,000)